THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXV. No. 625.] LONDON, MAY 4, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—10,000 cubic feet of gas per ton of coal: 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PA[illegible]NT CONDENSED COKE.
DO. G[illegible]ESFIELD COKE.

RAMSAY'S F...E-CLAY ARTICLES.
GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
SPECIAL GASOMETER PAINT
(Mixed ready for use).
FOUR PRIZE MEDALS.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
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WORKS: BRIXHAM, TORBAY.

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PURIFIERS & SCRUBBERS
MADE FROM THE BEST QUALITY
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WELL-SEASONED PLANKS.
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COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.
JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL,
Established at the commencement of Gas Lighting.
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COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
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Roofs, Girders, and Bridges, and General Smith's Work.
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RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.
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NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
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G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

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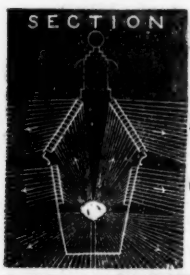
AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.



THE PATENT

CATOPTRIC LAMP

Is now in use in Moorgate Street, Cheapside, and Trafalgar Square, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.

T. A. SKELTON, 37, Essex St., Strand, LONDON, INVENTOR AND PATENTEE.

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PHŒNIX FIRE-BRICK WHARF,

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GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,

AND FOR THE

SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,

AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

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CLASS II.

This Paint having been in general use over thirteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced or resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

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MANUFACTURERS OF

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CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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EVERY DESCRIPTION OF TUBING, GAS, STEAM, HYDRAULIC TUBES AND FITTINGS,
EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

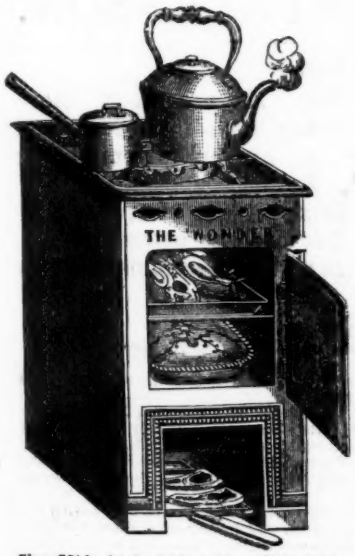
Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

To Messrs. John Wright and Co., Essex Works, Birmingham. *Crystal Palace District Gas Company, Lower Sydenham, S.E.*

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.



Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,
Has all the appearance of a Bright Fire.
PRICE from 35s.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

J. T. B. PORTER AND CO.,

ENGINEERS AND CONTRACTORS,

LINCOLN, AND 1, WESTMINSTER CHAMBERS, LONDON, S.W.,

Beg respectfully to remind Gas Companies and Corporations that they continue to manufacture and supply every description of Apparatus connected with the

MANUFACTURE OF GAS AND ITS DISTRIBUTION.

GASHOLDERS, PURIFIERS, SCRUBBERS, CONDENSERS, RETORTS, &c., &c.

PLANS, SPECIFICATIONS, AND ESTIMATES FOR WORKS OF ANY SIZE.

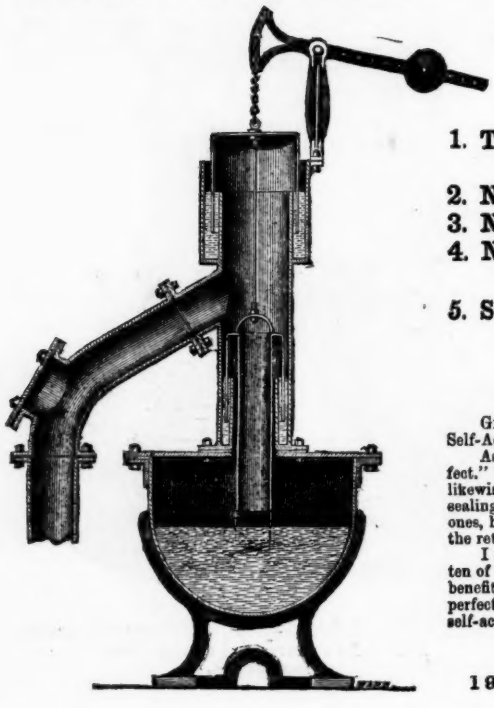
REFERENCES TO MORE THAN 500 WORKS ALREADY ERECTED.

PROSPECTUSES AND TESTIMONIALS ON APPLICATION.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. **There is no pressure on the Retorts.**
2. **No deposit of Carbon.**
3. **No scurfing is required.**
4. **Never a choked Ascension-Pipe.**
5. **Saves Fuel and Wear and Tear.**
6. **Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.**
7. **Is never out of order.**
8. **Requires no attention.**
9. **Is perfectly automatic in its action.**

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having been ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

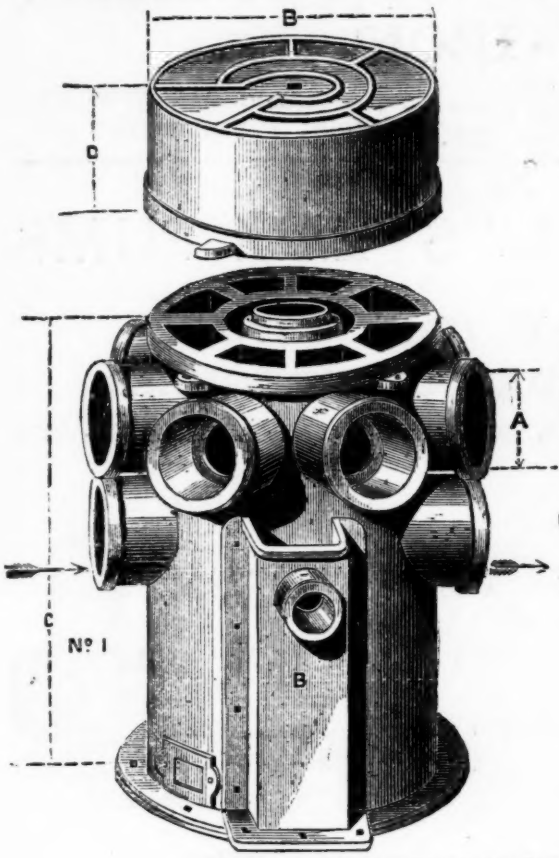
For terms of use and cost, apply to Mr. G. W. STEVENSON,

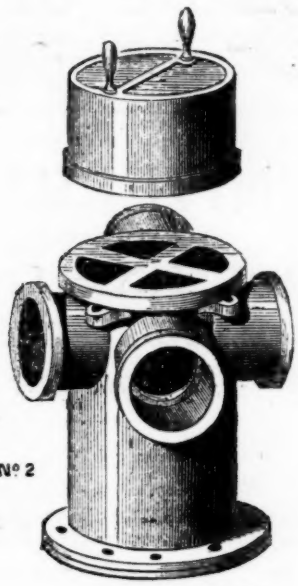
19, GREAT GEORGE STREET, WESTMINSTER.

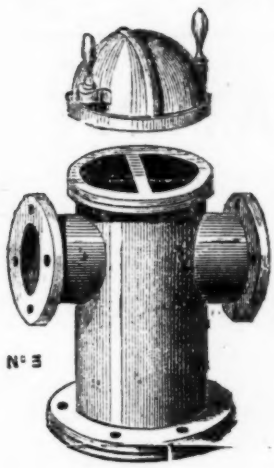
MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.







THORNCLIFFE
IMPROVED BYE-PASS VALVE.
SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE
IMPROVED STOP-VALVE.
SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

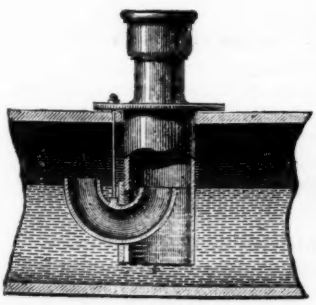
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Dip-Pipe, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

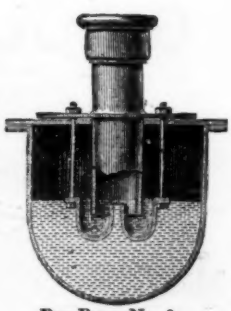
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



Dip-Pipe, No. 2.

FOR PRICES, TESTIMONIALS, &c., APPLY TO

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

GAS PURIFICATION & CHEMICAL Co., LIMITED.

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

THE

PATENT "UNIVERSAL" STEAM PUMP

WAS AWARDED, AT THE

VIENNA EXHIBITION, 1873,

THE GRAND PRIZE "MEDAL OF PROGRESS."

AT LILLE—GOLD MEDAL - - - - 1874. AT MANCHESTER—SILVER MEDAL - 1874.

OPINIONS OF THE PRESS.

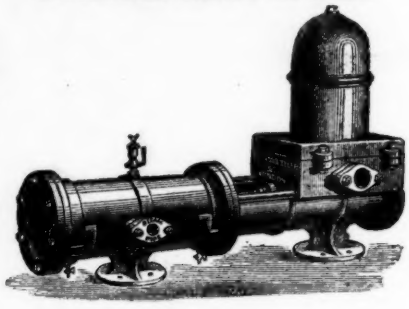
"The simplest machine of its kind."—*Engineering.*

"Remarkable for its simplicity and ease of action."—*Daily Telegraph.*

"None that we have noticed work so quietly."—*The Engineer.*

"Nothing invented in hydraulic steam power half so cheap and effectual."—*Griffith's Iron Trade Exchange.*

NO TAPPET VALVES OR GEAR.



IN USE IN SOME OF

THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,

FOR

TAR AND AMMONIACAL LIQUORS.

ONE SELECTED FROM AMONGST MANY TESTIMONIALS RECEIVED BY H. T. & CO.:—

"*Ardwick Bridge Chemical Works, Manchester, Oct.* 28, 1872.

"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily,

"Yours truly,

(Signed) "PETER HART, *Manager.*"

SOLE MAKERS,

HAYWARD TYLER & CO.,

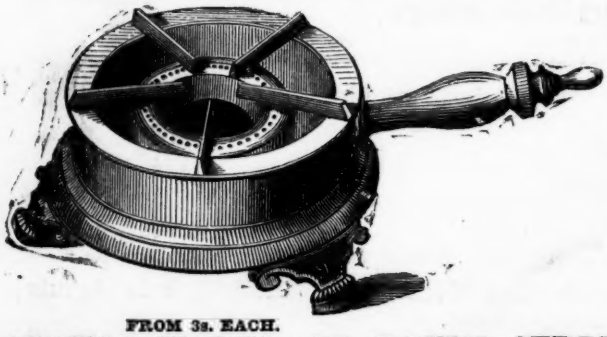
84 and 85, UPPER WHITECROSS STREET, LONDON, E.C.

PRIZE MEDALS—1862, 1867, 1871, 1874.

SIDNEY LEONI AND CO.,

SOLE LICENSEES AND AGENTS FOR GREAT BRITAIN FOR

GIROUD'S PATENT RHEOMETER.



This Instrument is easily fixed under any Burner; it regulates the volume of Gas to be consumed, notwithstanding the Size of the Burner or the Variation of Pressure.

Full particulars on application, also Pamphlets on the

"ADVANTAGES OF COOKING AND HEATING BY GAS."

With Illustrations, &c., of the latest and most improved

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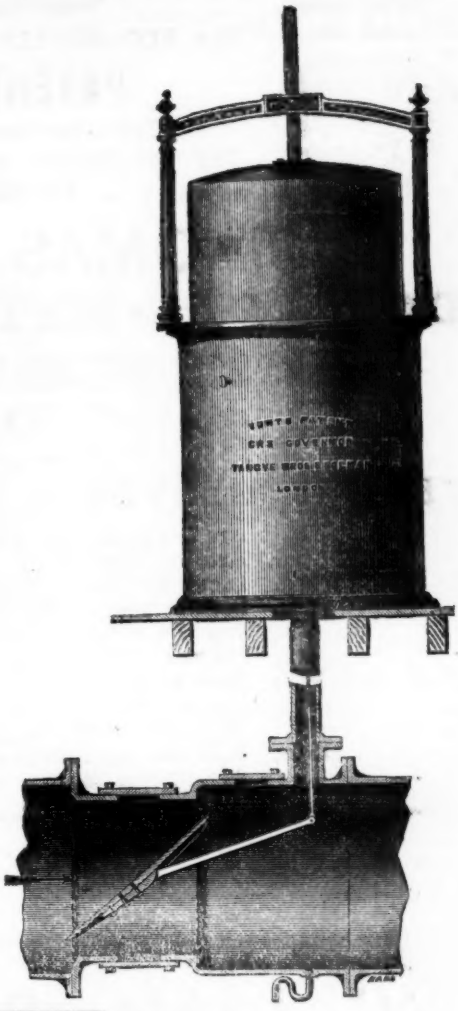
HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Co.—two 36 in. at Blackfriars.
" " a 36 in. at Goswell Road.
" " a 24 in. at "
" " a 24 in. at Whitechapel.
" " an 18 in. at Bow Common.
" " a 24 in. at Beckton.
" " a 6 in. at "
The London Gas Co.—a 24 in. at Nine Elms.
" " an 18 in. at "
" " an 8 in. at "
The Exeter Gas-Works—a 24 in.
" Abergavenny Gas-Works—a 10 in.
" Birmingham Gaslight Co.—an 8 in.
" Monmouth Gas-Works—an 8 in.
" Devonport Gas-Works—an 8 in.
" Cannes Gas-Works—an 8 in.
" Mentone Gas-Works—an 8 in.
" Rochdale Gas-Works—a 4 in.
" Imperial Gas Co., a 12 in at Great Cambridge Street.

TESTIMONIAL.

The Gaslight and Coke Company, 9, Water Street, New Bridge Street, Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

VIENNA EXHIBITION, 1873.—The highest prize and only Medal "for Progress" for Direct-Acting Steam Pumps for general purposes was awarded to TANGYE BROTHERS AND HOLMAN, Engineers, London, for

THE "SPECIAL" DIRECT-ACTING STEAM PUMPS.

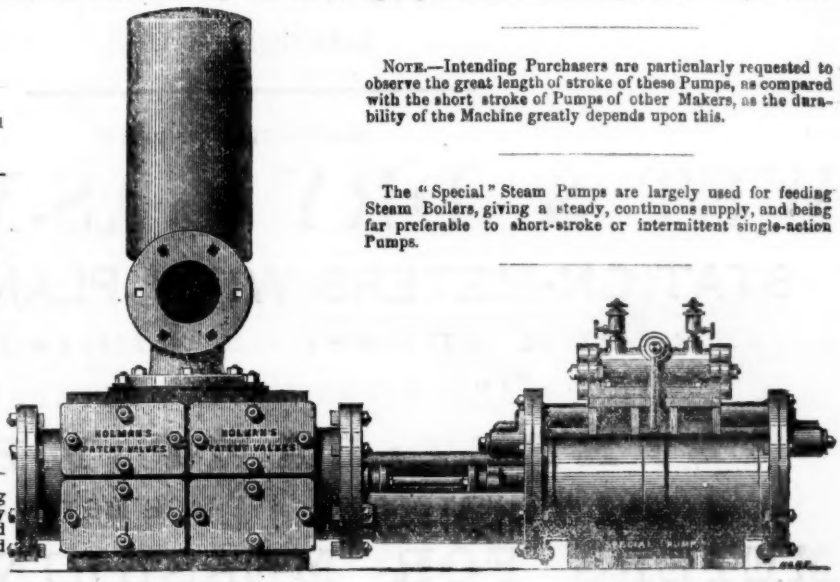
4000 have been sold since their introduction in 1867.

In use in over Ninety Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	550	£16
4*	2	9	970	18
3	3	9	2,200	18
5*	3	12	2,200	22 10
4	4	12	3,900	25
6*	4	12	3,900	30
5	5	12	6,100	32 10
7*	5	12	6,100	40
6	6	12	8,800	40
8*	6	12	8,800	50
7	7	12	11,900	50
10*	7	12	11,900	65
8	8	18	15,660	65
10	9	18	19,800	80
10	10	24	24,400	100
12	12	24	35,240	140

* These sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance piece between steam and pump cylinder at a small extra cost.



NOTE.—Intending Purchasers are particularly requested to observe the great length of stroke of these Pumps, as compared with the short stroke of Pumps of other Makers, as the durability of the Machine greatly depends upon this.

The "Special" Steam Pumps are largely used for feeding Steam Boilers, giving a steady, continuous supply, and being far preferable to short-stroke or intermittent single-action Pumps.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

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THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

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2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
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Are upheld for five years without charge.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 4, 1875.

Circular to Gas Companies.

THE state of Government business in the House of Commons is such, that we deem it exceedingly improbable that the second reading of the Metropolis Gas Companies (Regulations) Bill can be taken this evening. Another long postponement will, we take it, be unavoidable, and thus we are confirmed in our belief that the Bill is lost for the present session. Acting on this belief, we shall not notice at any length the "Reasons against the Second "Reading" which we published in our last. There is one point, however, on which we do not think sufficient emphasis was laid in that document. The Acts of 1868-69 do emphatically and distinctly guarantee the companies concerned their maximum dividends; and, on the faith of this guarantee, the new capital has been raised. Now, the Bill under consideration revokes this guarantee, and, if passed, would inflict a great loss on the shareholders of the companies. It is seldom that language so clear and distinct has been employed in Acts of Parliament. The Revising Commissioners, in the cases of the Chartered and Imperial Companies, could find no way of escape. They found themselves bound to give maximum dividends, and this, be it remembered, at the instigation of the authorities. It is now sought to alter this, and to compel the supply of gas at a price which will not allow more than two or three of the metropolitan companies to pay full dividends, and which may, in the case of another disturbance in the coal market, involve all the companies in an absolute loss. And no provision is made in the Bill for an alteration in this price. We dwell particularly on this as evidence of a desire on the part of the metropolitan authorities to depreciate the value of gas property, rather than promote the interest of consumers.

The Act of 1860 must be regarded as a parliamentary compact with the other companies, and the prices allowed by this Act may be considered as adequate for the present. A coal famine was never dreamt of when any of these Acts were passed, but recent events have clearly shown that a low and immutable maximum price is an impossibility. Some corporations have found this out, and have only been too happy to avail themselves of the Gas and Water Works Act Amendment Act to obtain an increase of price.

And this reminds us to call attention to the Act named, which is now inoperative. When passed, it was, no doubt, considered to provide for a temporary emergency, and it is true that the crisis has passed for the present. But who can tell how soon another coal famine may occur? Commercial panics, we know, recur at pretty regular intervals, and it is enacted that an Order in Council may at any time step in and provide against the worst consequences of such disasters. In ordinary trade, dearth of raw material and increased cost of production result in an increase in the price of a commodity, which is only limited by the reduction of consumption which always ensues. But, with statutory gas companies, the case is altogether different. Except in the case of three metropolitan companies, there is now no provision extant for raising the price beyond the maximum fixed by the special Act. The supply is compulsory, and there would certainly be no reduction of consumption if it were known that gas was supplied for less than cost price. On the contrary, under such circumstances, consumption would probably increase, with a proportionately larger loss to the company. We think, then, that we are justified in calling upon the Board of Trade for a permanent measure of the same kind as the Act of 1872. It is now too late in the session to expect any general legislation on gas matters from the Government, but an Act of the kind we now ask for ought certainly to be passed in the next year. We have recently been told, on high authority, that all Acts of Parliament require frequent reconsideration. How particularly this must be the case with such as bind parties to the supply of a specific article at a fixed rate, without taking into consideration the ever-varying conditions of production, we need not argue.

We believe we may now announce that all differences between the Tunbridge Wells Commissioners and the gas company have been arranged, and there will be no further opposition. The company, we understand, have made liberal concessions, which, we should hope, will ensure amicable relations with the commissioners in the future.

When writing of the Swansea Company last week, we fell into a slight error. It was not a full dividend for one half year of 1873 that was paid out of the profit of the past half year, but only a balance to make up a dividend for the period. As might be expected, the success of the company has stimulated their opponents.

The ratepayers of Blackburn, at a recent meeting, convened under the provisions of the Municipal Corporations (Borough Funds) Act, have sanctioned the expenditure of public money in opposing the Blackburn Water-Works Bill and the Blackburn Gas Order. As regards this latter, we should think the opposition comes rather late. In ordinary course, it should by this time have received the consideration of the Board of Trade, and if consented to, be ready for insertion in the confirmatory Bill. The rules of the Board of Trade prescribe that all objections to a Provisional Order shall be sent to the office before Jan. 15; and it is, we think, open to question whether a meeting can sanction the payment of expenses incurred before the meeting was held.

Some ratepayers at Southampton profess to be alarmed at the prospect of the purchase of the gas-works for the sum agreed to by the mayor. But if the works are managed on the Manchester system, and as proposed by the Mayor of Birmingham, there is not the smallest ground for alarm. It is only the gas consumers who will suffer, and they will have the satisfaction of knowing that they (supposing the purchase made) will contribute most largely towards making Southampton "beautiful for ever." We have no wish to see the undertaking absorbed by the Corporation; the ratepayers, as ratepayers, will probably gain, and the consumers

be not so well off as before. How differently an increase in the price of gas, and an advance in the rates, affect a consumer, may be seen in the evidence given by Mr. Nettlefold before the committee on the Birmingham Gas Bill, and reported in our last. The witness showed that 1d. per 1000 added to the price of gas would to him, as a large consumer, be a much more serious matter than an addition of 1d. to the borough rate; and thus it is made clear that gas consumers are unequally taxed when gas profits are applied to improvement purposes.

The laws of the Institution of Civil Engineers unfortunately exclude reporters from their meetings, and thus, although we were able to give an abstract of the paper read by Mr. H. Jones, "On the Construction of Gas-Works," printed in the "private "press," we have been unable to publish the important discussion which followed. As every one who is in the habit of attending scientific meetings well knows, the debate on a paper (we do not say it was the case in this instance) is often of much more value than the essay that provoked the discussion. There are only two learned bodies of much importance in London, we believe, who exclude reporters, and they are the Royal Society and the Institution of Civil Engineers. The former never publish discussions at all, the latter only issue them to members, or, as in the case under notice, allow their publication in a separate form. Mr. Jones's paper has now been published at length, with the discussion, and we shall, on an early occasion, furnish such an abstract of the discussion as may be desirable. For the present, we confine our remarks to a notice of the observations of Mr. O. C. D. Ross, which have been elaborated into a paper, and published with the consent of the Institution. They relate to the "use of petroleum "and other mineral oils in the manufacture of gas." We have previously (*ante*, vol. xxiv., p. 285) reviewed a pamphlet by the author, entitled "Air as Fuel," in which his process for gas-making was referred to; and we remarked that the invention of the author appeared to be a simple carburetting process. This turns out to be the fact. The invention is a revolving fan, actuated by a falling weight, which drives air through a carburettor containing the lightest petroleum spirit, and thereby a combustible, but we should think not a highly illuminating mixture, is distributed to the burners. The invention is anybody's, from Mongruel to Kromschroeder, and perhaps a hundred others. The peculiarity now is, that the author has a special petroleum product of very low density and boiling point, which is easily vaporizable, and, in conjunction with air, remains in a state of vapour. No specific information is given as regards the illuminating power of the gas; but we have no hesitation in expressing a confident opinion that the mixture proposed cannot exceed 14 or 15 candles. The assertion that petroleum gas in America has the illuminating power of 80 candles, is misleading, for nothing but the vapour of the heaviest hydrocarbons, without any admixture of air, could produce this illumination. It seems clear that the author does not fully understand the American method of manufacture of petroleum gas, for he says that "superheated steam is the medium used for "holding the luminiferous vapour." The idea of distributing superheated steam and petroleum vapour for illuminating purposes is very rich. There is, no doubt, a field for inventions of this kind when the proper spirit has been obtained. The author professes to have secured it. At present he tells us it is cheap, and if it should become a commercial product, he assures us it will be cheaper. We doubt this. Crude petroleum may or may not be as inexhaustible as coal; but crude petroleum contains but a small proportion of this very light spirit, and whenever a demand for the article springs up, we have a strong conviction it will become dear. The idea that the use of petroleum for gas will reduce the price of coal to general consumers is absurd. The author overlooks the fact that the bulk of the coal used for gas-making is left in the shape of coke, which is a cheaper fuel. Lastly, as regards safety, the author correctly states that petroleum is not explosive. He goes on to say that "the vapour, like gas, will "easily take fire, but will not explode in any other sense than this, "that if it were allowed to collect in a closed space—such as a "room in which the doors and windows were closely shut—then if "a lighted candle were brought incautiously into the room, all "the vapour would take fire at once, precisely in the same way "that gas would do"—and we may add, with precisely the same results—the destruction of all the windows, and probably a good deal of the furniture, with a considerable scorching to the incautious introducer of the light.

The author speaks of having introduced his apparatus with success to a large establishment in Brussels. Precisely similar inventions have been introduced into scores of houses in this country, and the apparatus now lies in lumber-rooms, if it has not been sold for old iron. It must not be supposed that we look upon the author's "invention" with jealousy. Gas companies may regard with perfect complacency every attempt to substitute, on a large scale, carburetted air for coal gas.

Water and Sanitary Notes.

On Friday last the Marquis of Salisbury introduced to the House of Lords a Bill to prevent the pollution of rivers. The Bill is not yet printed, but its main features may be gathered from the speech of the noble marquis. It would seem to be a measure not likely to satisfy enthusiastic sanitarians, while, if it should pass, as it most likely will, a great deal of trouble and expense will be occasioned to towns and manufacturers. The evil, however, is great, and the necessity of doing something towards its abatement is urgent. Under these circumstances, the Bill may be accepted as a moderate, and, for the most part, an unobjectionable measure. In the first place, the Bill proposes no arbitrary or fanciful standards of purity for matters to be discharged into a stream. It is left to the common sense of a judge and jury to decide whether or not the matters complained of are noxious and offensive in character. The tribunal is to be the county court, the selection of which by the Government shows a desire on their part to reduce the expenses of the proceedings to a minimum. We may remark at once, that we consider the tribunal selected a fairer one than an assembly of local magnates at quarter sessions. As regards sewage, the Bill appears to provide that it must be made free from "polluting filth" before it is sent into a stream. Now this is absolutely impossible of fulfilment, even if intermittent downward filtration be resorted to. Some of the worst pollution will obstinately remain in solution, and can only be got rid of by oxidation in a stream. Ordinary defecating and filtering works, which, when they are carefully managed, remove all suspended solid matters, leave much more dissolved impurity. We may take it, however, that the law is not to be made too stringent, and if towns do their best to clarify their sewage, they will be free from molestation. As far as they concern manufactories, the provisions would seem to be of a liberal character. All who have been in the habit of sending their refuse into a stream for 12 years will be allowed two years from the passing of the Act to make their arrangements for purification; and those who have a longer prescriptive right to the use of a stream, will only be compelled to adopt "the best practicable and available means" of rendering their refuse innoxious. The duty of putting the Act in force is thrown upon the local sanitary authorities, but the Local Government Board may take proceedings where the purely local authority refuse to act. We gather nothing about penalties from the speech of the Marquis of Salisbury; but the fact that the county court has been chosen as the tribunal, would seem to indicate that the Government have no intention to extort excessive fines. We shall return to this subject when we have the Bill before us.

The Leeds Corporation, after having given a long trial to the A.B.C. process at their sewage works at Knostrop, gave up that method of purifying sewage, and allowed the Clarifying and Utilization of Sewage Company to have the use of the works for experiments. The Corporation do not seem to have been satisfied with the results of these, and have now determined to make a further trial of the A.B.C. process. As a result, we notice that speculation in the shares of the Native Guano Company has been active during the past week.

We see with much regret that the Water-Works Committee of the Corporation of Halifax have been compelled to limit the supply of water. They have determined to shut off the supply from 8 p.m. to 5 a.m., with a view to save the night leakage. If this be the state of things in the green leaf, what will it be in the dry, unless Nature comes to our relief with abundant rain, and makes an uncomfortable summer? It would seem clear that the means of supply at present at command by the Corporation of Halifax are utterly inadequate to the wants of the population, and must be supplemented.

The last report of the engineer to the Water-Works Committee of the Corporation of Liverpool shows that the water is falling in all the reservoirs but one, and that there is also a decrease in the yield of the wells. A special report on the Bootle Well water was presented, which set forth the excessive hardness of the water, the result probably of the access of drainage from large deposits of soda waste in the neighbourhood, and the presence of magnesia, which it was conjectured indicated the access of sea water. A sensible suggestion was made that the Rivington water, and that from the well, should be mixed in the proportion of two of the former to one of the latter, in which case the supply would be free from objection. The chairman of the committee remarked that in Liverpool the demand would soon be for water, good, bad, or indifferent, and we are sorry to think that the same demand will have to be made in many other places. Unless *Jupiter Pluvius* furnishes us immediately with a liberal rainfall, towns dependent on that source for water will soon have but a scanty supply; and in the autumn, springs and streams may be expected to be low, in consequence of the deficient rainfall last year. Taken alto-

gether, our prospects for the coming summer and autumn, as regards water, we regret to say, are exceedingly bad.

The preamble of the Birmingham Corporation Water (Purchase) Bill has been passed as proved by the Commons committee. When the announcement was made, the company withdrew, and the opposition will be renewed before the Lords committee.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

LXII.

Gasholders.

The cost of gasholder-tanks is sometimes estimated according to their cubical capacity, supposing the interior of the vessels to be flat, as they were formerly constructed. Thus the tank already described, of 33 feet 6 inches diameter and 12 feet 2 inches deep, is equal to 10,500 feet, and its cost is about £16 10s. per 1000 feet capacity.

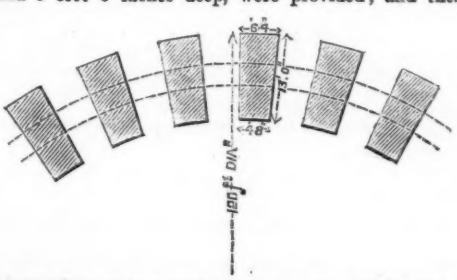
In the very interesting paper on "Gasholder-Tanks in Concrete," read by Mr. Douglas, of Portsea, at the last meeting of the British Association of Gas Managers, he represented the prices of the vessels in question, as erected at the Beckton Gas-Works, as varying from £13 14s. to £14 16s. per 1000 feet of tank capacity, which latter price may be regarded as a fair average of the cost in general when in good ground. He also stated that the cost of brick tanks at the South Metropolitan Company's works varied from £17 to £26, and that a brick tank at Portsea cost no less than £28 per 1000 feet capacity. Against these high prices it may be stated that the tank at the Imperial, Pancras, station, already alluded to, cost something under £10 per 1000 feet, and another at the Fulham station, which will be referred to hereafter, considerably less than that. Of course the price must be entirely dependent on the material at hand, and the nature of the site. We have known instances of tanks of large capacity, constructed of stone, at under £9 per 1000 feet, the moderate cost being due to the cheapness of the material in the neighbourhood.

The high prices quoted at the South Metropolitan and Portsea works must have arisen from some local difficulties, either from the position of neighbouring buildings requiring extensive shoring, bad ground, or the presence of water, or, probably, all combined; and we may fairly assume that these expensive structures are not of recent date. Our impression is, that tanks of all sizes, except under extraordinary difficulties, should be constructed on an average of £15 per 1000 feet capacity. In confirmation of these views, we refer to the cost of one of 65 feet 6 inches diameter and 22 feet deep, built in cement and embedded in puddle, which was about £13 10s. per 1000 feet; as also the different prices already given, as well as those hereafter to be presented. There are instances where these prices may be materially reduced, but they should be rarely exceeded, and it must be remembered that our observations apply to the present time, when a marked progress has been made in the construction of tanks. The various new methods adopted in the construction of these vessels further encourage this opinion, and there is reason to believe that considerable economy is yet to be effected in these expensive apparatus. Under like conditions of nature of ground, price of materials, and manner of construction, there will be but little difference between the cost per 1000 feet capacity of a tank of the largest and one of ordinary dimensions.

In situations such as the immediate neighbourhood of a non-tidal river or sea, where the ground is so loose or porous as to render all attempts to remove the water by pumping impracticable, and where it is desirable to obtain as great a depth as possible, the foundations of tanks are sometimes constructed within the water, for which purpose caissons are advantageously employed, particularly in localities where the site is composed of sand.

A tank of 102 feet in diameter and 30 feet deep, of which depth 6 feet projected above the level of the ground, built according to the circumstances mentioned, once came under our notice, of which we give a short description.

In the construction of this tank, the site of which was ground reclaimed from the sea, the necessary excavation being made to the water level, an annular foundation of 120 feet external and 94 feet internal diameter, and 3 feet 6 inches deep, was formed within the water. For this purpose, three sheet-iron caissons or boxes, without top or bottom, each 13 feet long, 6 feet 4 inches wide at one end, and 4 feet 9 inches at the other, corresponding with a portion of the circle, and 3 feet 6 inches deep, were provided; and these were



slightly tapered, so as to permit of them being lifted with facility when the concrete was set therein. During the progress of the work the caissons were placed in their respective positions, as represented in the diagram, with intervening spaces equal to their width. The ground was then excavated from the interior of one of the vessels, at the same time it was driven down by a heavy mallet until its upper edge was at the surface of the water. All the earth being cleared out to the depth of 3 feet 6 inches, the operation of filling with stones and cement concrete was then commenced. This was accomplished first by throwing into the centre large blocks of stone, which were readily procured, and afterwards the whole of the caisson was filled with concrete. In this operation, of course, the water was expelled therefrom, and percolated through the surrounding ground.

At the end of three or four days, the cement being set, the caisson was raised, leaving a block of concrete or stone of about 9 cubic yards, which, like the whole of the foundation, in the course of a short time acquired an extraordinary degree of hardness.

In the meantime, the other caissons were being employed in a similar manner, so that a range of six blocks of concrete, as shown, was completed, when the intervening spaces were closed at each end by a sheet of iron, sustained by one or more stakes driven into the ground, in order to form the foundations therein. The earth was then removed, and the spaces filled with stone and concrete, as described, until the circle was completed, and thus the foundation was formed within the water, without having occasion to pump a single gallon.

The wall, which was 4 feet thick at the bottom, and 2 feet 3 inches at top, was built in the centre of the foundation, as represented by the dotted lines, and consisted of a facing of square stones, averaging 2 feet superficial, set in regular courses, and backed with rubble, the top being finished by a coping. In the centre of the tank a dome was formed by the earth, and over this a layer of concrete, 15 inches thick, was placed, the base of which abutted against the annular foundation. The dome was further covered by two courses of tiles set in cement. As the wall projected 6 feet above the surface of the ground, by way of precaution, an iron hoop, 5 inches by half an inch, was built into the top just under the coping.

This tank was as perfect as possibly could be desired, and any rainfall, however slight, was carried off by a pipe inserted for the purpose. On account of the low price of the building material employed, its cost was hardly £10 per 1000 feet tank capacity. On the Continent, in small and medium-sized gas-works, the holder-tanks, when constructed of masonry, often project 6 or 7 feet above the level of the ground, whilst in England the general practice is to construct them level with the surface. Certainly this latter system has some objections, particularly when, by sinking an extra depth of a few feet, water is met with which could be avoided by building a portion of the vessel above ground. An objection which has been raised against this method is, that the water arising from a leakage, on becoming frozen, would expand and crack the tank. The reasoning is perfectly correct, supposing such a leakage; but in a well-constructed tank this contingency should never exist.

Where stone can be procured at a moderate cost, very excellent tanks are constructed with it, but to employ puddle in such a case would simply be an unnecessary expenditure of money, without the slightest cause or utility; for, with the most moderate care in building with ordinary close-grained stone, a perfectly sound tank can be assured.

As the works executed by our most eminent engineers must be of great interest to all engaged in gas manufacture, we proceed briefly to refer to a few of them.

The Beckton works, designed and constructed by Mr. F. J. Evans, the engineer-in-chief of The Gaslight and Coke Company, commenced operations with four gasholders, the tanks of which are each 182 feet diameter and 40 feet deep. In the centre, the earth is left in the form of a frustum of a cone, of 160 feet diameter at base and 100 feet at the top, and in vertical section about 25 feet high. Over the whole area of this, as well as under the walls, is a layer of puddle, of a uniform thickness of 2 feet. On this the footings of the wall are built, and for 15 feet above these the wall is 4½ bricks, or about 40 inches thick; for the next 15 feet, 4 bricks thick; for the next 5 feet, 3½ bricks thick; and for the next 5 feet, 2½ bricks thick. The full height of the wall is completed by a stone coping 12 inches thick and 24 inches wide. There are 28 piers, each 6 feet thick by 8 feet 9 inches wide, for the holding-down bolts, and a thickness of 2 feet of puddle is placed against the whole exterior of the wall. Over the area of the interior of the tank is laid a bed of concrete 1 foot thick, and on this a course of bricks on edge set in cement, and in the centre of the cone there is a granite block for supporting the king-post when the gasholder is down. The dry well to each tank is 10 feet internal diameter, rendered inside and outside with fine Portland cement; the inlet and outlet pipes are 30 inches in diameter.

These tanks, with the exception of the coping, and a few other stones, were constructed entirely of bricks; the different earths traversed in the excavation were—clay, 8 feet; peat, 10 feet; silty sand, 3 feet; and the rest gravel.

The largest tank, that we are aware of, is that at the Fulham station of the Imperial Gas Company, designed by Mr. T. N. Kirkham. This is 233 feet in diameter and 32 feet deep, and the holder is capable of containing 2,600,000 feet of gas.

This tank is also constructed of bricks, the lower courses of footings being 7 bricks wide, and the upper courses of the same being 6 bricks wide. From this point, to a height of 10 feet, the wall is carried up 4 bricks thick, and, for a further height of 7 feet, 3½ bricks thick; again, for another 7 feet, 3 bricks thick; and, above this, 2½ bricks. The whole is built in alternate rings of 3 feet in Portland cement, and 5 feet in hydraulic mortar. The vessel was

first commenced by a contractor, who failing to carry out the work, it was completed by the company; and, as we are informed, it appears to be about the cheapest of this class of structure in existence, its cost being £10,000, or little over £7 per 1000 feet.

The holders more recently built by the Imperial Company have been limited to two million cubic feet, and, by the kindness of the engineer, Mr. Kirkham, we shall shortly be enabled to present a detailed account of their construction. We are informed that that gentleman does not share the opinion of other eminent engineers, that gasholders have reached their maximum capacity; on the contrary, he is of opinion that, with the daily increasing consumption, they will eventually be made of a capacity of five million feet each. If we reflect that probably not more than a fifteenth part of the private dwellings of the metropolis are supplied with gas, that its use is daily rapidly augmenting, that the increased supply by the various companies is about 12 per cent. per annum, it is not unlikely that, in the course of a few years, gasholders will attain the gigantic proportions mentioned, more particularly as there is no practical difficulty in such erections; for, unlike steam vessels, which are restricted in their dimensions, by the depth or the width of various harbours, gasholders may be considered practically unlimited in their dimensions.

To convey some idea of the operations of the metropolitan gas companies, and the necessity of large holders, it may be stated that the supply of gas from the Imperial Company's works on the 24th of December last, was no less than 23 million cubic feet; and we may fairly assume that the total consumption in London on that day, was upwards of 82 millions, representing a money value of nearly £20,000. Hence, with these figures, and the rapid advancement of gas lighting, it will be no matter for surprise if gasholders assume, during the present generation, dimensions which at the moment appear almost incredible.

(To be continued.)

Communicated Article.

THE LIGHTING, WARMING, VENTILATION, AND WATER SUPPLY OF THE NEW OPERA HOUSE AT PARIS.

(FROM OUR PARIS CORRESPONDENT.)

(*Concluded from page 478.*)

WARMING AND VENTILATION.

The combination of the two services of warming and ventilation constitute one of the problems most difficult of solution in the case of a building intended for spectacular representations. The following is the mixed system employed by M. Garnier for effecting by turns the circulation of hot and cold air in the various parts of the new Opera House.

A portion of the vast basement of the edifice is occupied by 14 heating furnaces, some of which are hot-water apparatus for warming the offices of the administration, the stage, and the *artistes* boxes, the others furnishing a supply of hot air for the service of the theatre, the lobbies, and the staircases. Each of these heating apparatus occupies an area of nearly 220 square feet, and when they are all in action, their daily consumption of coal is estimated to be about ten tons, to which must be added the wood consumed by the 450 stoves in the apartments occupied by the management, by those in the *artistes* rooms, and by the two monumental stoves in the grand lobby. The heat produced by all these apparatus is conveyed into the various parts of the building by means of vast conduits, the amplitude and direction of which had necessarily to be calculated with precision, the greater part of them being fixed during the construction of the walls.

The warming of the stage, the *artistes* rooms—in a word, the whole of what may be strictly called the theatre—is effected by means of three heating apparatus, served by eight furnaces, the strength of which would be represented by a steam-engine of 60-horse power. From these the heat is conveyed to all parts of the house by cast-iron piping, the total length of which is about 5000 mètres, or rather over three miles. The apparatus themselves have a heating surface of nearly 2700 square yards.

Around these pipes, which are filled with hot water and enclosed in a sheathing of masonry, air drawn from the outside of the building is caused to circulate; this air becomes heated, and is distributed into the several apartments intended to be warmed. This is done by means of a number of openings (some 650), through which the hot air passes, and by the working of these the temperature may be kept uniform in all those parts of the building which are occupied by the *artistes*.

The sheathing of masonry surrounding the hot-water pipes extends altogether to a length of 1640 yards. These pipes also supply the heating surfaces intended for warming the floor of the stage, which consist of receivers filled with hot water, and placed immediately beneath the boards, which are thus warmed by radiation. These heating surfaces present a total area of rather over 700 square yards.

In all this part of the building, hot water is the sole heating medium employed; other means have, however, been resorted to for warming the theatre and its approaches.

The auditorium—that portion of the house in which the audience remain for the greatest length of time, and in which thoroughly efficient ventilation should be constantly maintained—is heated by hot-water apparatus, which necessarily furnish a considerable change of air. The corridors, the vestibules, and the grand lobby are provided with hot-air heating apparatus, ten in number, which are served by twelve furnaces having a power equivalent to that of a 120-horse steam-engine.

It was necessary to employ apparatus of this power, for, being in operation only on the days of performance, they are, of course, not always alight, and they are required to be capable of raising the temperature of spaces having a capacity of not less than 3 million cubic feet. They have, besides, to supply the theatre with a change of air at a rate attaining something like 2,800,000 cubic feet per hour. Beyond this, the heating surfaces of the hot-air apparatus must be reckoned at from 6500 to 7500 square feet, and those of the hot-water apparatus at from 13,000 to 14,000 square feet.

The ventilation of the building is effected by means of several air inlets, having openings of an area ranging from 250 to 320 square feet, and on either side of the cupola of the theatre, above the side galleries, vast bays have been contrived. This system is completed by the bull's-eye windows in the cupola.

The entire surface of this cupola, above the ceiling of the theatre, is occupied by a number of apparatus of considerable size, which serve to carry away the hot air. From this point an extensive system of piping radiates into all parts of the house. Some idea may be formed of the importance of this arrangement when it is considered that under the flooring of the boxes on each tier there is an air conduit as well as a pipe for the conveyance of heat. In the cupola are placed the dampers, 34 in number; these are large valves 4 feet 6 inches long by 2 feet high, which may be opened or closed at will for the purpose of regulating the air inlet corresponding to each box. These dampers allow of the mixture of either a small or a large quantity of cold air with the hot, before its introduction into the theatre.

The question of the expulsion of the vitiated air is one of great importance, and its solution is imposed upon the constructor of every building intended for the reception of large numbers of persons. The grand chandelier in the new Opera House, while delighting the eye by the brilliancy of its many lights, at the same time performs the functions of a draught chimney, capable of perfectly purifying the entire area of the theatre. In addition to this, conduits placed in the roof of the circular vestibule, beneath the theatre, also assist in drawing off the vitiated air. These openings, as well as those at the backs of the boxes, communicate with a vast network, which in its entirety forms a kind of outer casing to the theatre. These latter conduits rise vertically to the upper part of the house, where they unite in eight receivers, opening into a sheet-iron chimney, 26 feet in diameter, placed above the chandelier. This chimney terminates in the lantern surmounting the cupola. The heat produced by the 556 burners in the chandelier, and by the ring of 244 lights round the theatre, naturally causes a very strong draught. In this respect, however, the broad corridors in the new Opera House, coupled with the vast dependencies annexed to it, which now for the first time surround a building intended for theatrical performances, all help to exercise the most favourable influence; and thus it is that in this vast edifice everything that has been done with the view of pleasing the eye has at the same time its practical utility.

WATER SUPPLY.

The water supply arrangements in the basement of the new Opera House consist of two service-mains, one receiving water from the Canal de l'Ourcq, the other being supplied from the River Seine.

There are nine tanks and four vats in different parts of the building, and these afford storeage accommodation for over 23,000 gallons of water, the distribution of which is arranged as follows:—

In the Apollo reservoir	2,860 galls.
„ two tanks above stage	3,740 „
„ four vats	5,280 „
„ two tanks between stage and theatre	7,040 „
„ two tanks in side roofs	1,980 „
„ two tanks over administration apartments	2,200 „
Total	23,100 galls.

The total length of piping, in cast iron, copper, and lead, in use in the building is 7540 yards, or rather over 4¼ miles. The proportions employed are as follows:—

Cast iron	4424 yards.
Copper	1100 „
Lead	2016 „
Total	7540 yards.

In the fitting up of this extent of piping 573 taps of various kinds have been employed. They consist of:—

Sluice cocks	349
Float „	67
Lever „ (called "cataracts)	44
Head „	20
Fire „	93
Total	573

It will thus be seen that it is scarcely possible for a failure to occur in the supply of water for the numerous requirements of the theatre, especially for that which, in such a building, supersedes all the others—namely, to do battle with fire.

For the administrative service there have been fitted up—

Marble lavatories	44
Syphon sluices	44
Small cisterns for lavatories and closets	60
Water-closets	60

The fire service is supplied partly from the tanks and partly from the pressure-vats.

The whole of the tanks are connected by means of two crowns, the upper one, of cast iron, extending over the stage and theatre; the lower one, of copper, located in the cellars of the building. These two crowns are united by vertical columns of copper, carrying the *établissements*. By this term is understood a collection of appa-

ratus placed in cupboards, of which the firemen have the keys, which is really a hydrant, having a screw-tap, upon which the hose-pipe is mounted, and, in addition, a staff, two 32-feet lengths of india-rubber hose-pipe, a bucket, and a sponge. There are altogether 70 of these *établissements*, and the total length of the hose-pipes is nearly 5000 feet.

The three tanks for the stage are placed under the framework of the roof. They supply the fire-plugs upon the stage, the management apartments, and the theatre.

By the aid of compressing apparatus, a very strong jet of water may be thrown to the highest tier of boxes. These consist of four vats, two of them containing altogether 2640 gallons of water, the others being filled with air compressed to twelve atmospheres, by the expansion of which the water may be projected with great force to a considerable distance.

Adding the 18 exterior fire-plugs, the foregoing are the most perfect means that have been devised up to the present time for affording assistance in case of fire. There remains only one wish to be expressed, and that is that the precautions which have been so well taken may remain for ever useless.

Correspondence.

MALAM'S PATENT PROCESS OF GAS-MAKING.

SIR,—Allow me add a little to the controversy on the "Malam Process," going on just now in your columns. It is an old saying, "There's no one so blind as those who *won't* see." A little practical experience and common sense is worth a great deal of theory and nonsense.

I, like Mr. Smith, went to Dumfries and tested the process there, not with the intention of *reporting upon it*, but to elicit the truth, and, if I saw any good in it, to adopt it at some works I have on lease. As there was not much difference in the expense, whether I put in retorts on the old system or those of Malam, I put in Malam's arrangement, and have had a full quarter's working, ending the 31st of March last, and the result has been that, taking the less quantity of coals used, the increased quantity of gas made and sold over the corresponding quarter of last year, and dividing that by the quantity of coals used, the saving has been 14s. 4½d. per ton of coals carbonized.

The number of benches and retorts in action was only *one-half* the number required in the winter previous. It is, however, right to state that the retorts were new, while the previous ones were doing their third winter; but an exhauster at "level gauge" was in action in both cases, and the coals used were the same description of Newcastle.

This result, although satisfactory to me, is not so good as I had anticipated, owing probably to my putting these retorts into old benches, instead of having benches specially built for the system—an expense to which I did not care to go to in trying a new process. I am, however, putting up more retorts in new benches at another work I have, and expect better results.

As there appears to be a little haziness in the minds of some people with regard to the tar produced in this process, I have forwarded to you two samples for the inspection of yourself and any one interested in the matter. These samples I saw taken—No. 1 from the tanks under the mouthpiece, and No. 2 from the condenser well. No. 1, being thick and viscid, requires warming to get it out of a barrel; while No. 2, which has been deposited in a horizontal condenser, has the ordinary appearance of gas tar. There are about 4 gallons of No. 1, and about 3 gallons of No. 2 produced per ton of coals, the yield in this system being only about 7 gallons, instead of 10 by the ordinary process.

The ammoniacal liquor not being utilized at present, I have not taken notice of it. It appears to be the same as by the old process, and I cannot understand why any man in his senses can see objections to the process through the medium of the liquor, or how the process can interfere with the *yield* and *strength* of ammonia water. The process is the same as is done every day for scrubbing purposes; a small portion from the tanks supplying the scrubbers is allowed to pass down the ascension-pipes, keeping them cool—at least, below 100° Fahr.

Mr. Patterson, who evidently knows more about gas matters than some people "north the Tweed," thinks there are two drawbacks to this process. I think I have shown his fears are groundless. At the same time, he has given Mr. Smith food for reflection, which may be profitably employed between this time and the meeting of the North British Association of Gas Managers, at which he is "engaged to appear."

And what can be said to "Lesmahagow?" Evidently Mr. Smith and he understand each other. I enclose you the two circulars I received from Mr. Malam last year, and each of them has the words "Lesmahagow" says Mr. Malam omitted "for the purpose of leading the public astray." Mr. Malam, no doubt, is very well able to take care of himself; but I wish to protest against such misrepresentations being made.

JOHN SOMERVILLE.

22, *Westmoreland Street, Dublin, April* 29, 1875.

[It is right to state that our correspondent, "Lesmahagow," referred to Mr. Malam's letter, published in the JOURNAL of the 20th ult., from which the paragraphs referred to in Dr. Wallace's report are certainly omitted. Probably our correspondent, like ourselves, had never seen the circulars of which Mr. Somerville encloses us copies.—ED. J. G. L.]

VENTILATION OF BED-ROOMS.

SIR,—Under the above heading, in your issue of Jan. 5, 1875, Mr. Magnus Ohren, A.I.C.E., quotes from the *Scientific Press* of San Francisco, then from myself, in discussion of the mooted question whether the carbonic acid from a sleeper, in a close room in winter, sinks to the floor or not; and concludes, probably a little facetiously, to the effect that, however scientific views may conflict, a gas-stove, in such cases particularly, is "a good thing to have about the house;" a judgment which I deem to be "righteous altogether."

In reference, however, to the question of the subsidence of expired carbonic acid in cold bed-rooms, which I have deemed to involve a popular error quite widely spread, I would ask the consideration of Mr. Ohren, and of your readers generally, to some recent illustrative experiments by the distinguished sanitary chemist, Pettenkofer, of Munich, which I have found quoted in the sixth annual report (1875) of the Massachusetts Board of Health, p. 224. These experiments were made at a mineral spring at Marienbad, where carbonic acid is largely evolved. He estimated that, if no diffusion took place, at the end of an hour, the building would contain, over the surface of the water, a layer of carbonic acid 12 feet in thickness.

Pettenkofer found the gas escaping from the water contained 70 per cent. of carbonic acid; the air 3 inches above the surface contained 31 per cent. of carbonic acid; 10 inches above the surface, 23 per cent.; 40 inches above the surface, 2 per cent; and 55 inches above the surface, less than ½ per cent.

As the carbonic acid is evolved continually, we see how rapidly it diffuses into the atmosphere, or how rapidly the gases of the air diffuse into the carbonic acid layer, so that, at a height of 40 inches above the surface of the water, the carbonic acid amounts to only about 2 per cent. of the volume of the air, and this, too, in a space enclosed by a structure built of boards, and not freely open to the air.

Hoboken, N.J., April 1, 1875. HENRY WÜRTZ.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, APRIL 26, 1875.

The LORD CHANCELLOR acquainted the House that no further Standing Orders are applicable to the Pemberton Local Board Bill.

The Eastbourne Water Bill was read a second time, and committed.

The Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water Bill, brought from the Commons, was read the first time, and referred to the examiners.

GAS AND WATER ORDERS CONFIRMATION BILL.—This bill, for confirming certain Provisional Orders made by the Board of Trade under the Gas and Water Works Facilities Act. 1870, relating to Blackburn Gas, Brighton and Hove Gas, Littlehampton Gas, North Bierley Gas, Weymouth Consumers Gas, Wolverhampton Gas, Bognor Water, Newington Water, Newport (Isle of Wight) Water, Bridgend (Glamorganshire) Gas and Water, was read the first time, and referred to the examiners.

A petition against alteration in the Pemberton Local Board Bill was presented from Sir R. T. Gerard.

TUESDAY, APRIL 27.

The Longton Gas and Eastbourne Water Bills were reported, without amendment.

The Bath Gas, Pontypridd Water, and Ossett-cum-Gawthorpe Local Board Bills were read a second time and committed.

The Inverness Water and Gas Bill was read the third time, passed, and sent to the Commons.

The Alford Gas and Portishead District Water Bills, brought from the Commons, were read the first time, and referred to the examiners.

GAS PROVISIONAL ORDERS, 1875.—A report to Parliament under section 4 of the Gas and Water Works Facilities Act, 1870, of a case in which the consent of a local authority has been dispensed with, was laid before the House (pursuant to Act), and ordered to lie on the table.

Petitions against the Pemberton Local Board Bill were presented from (1) Meyrick Bankes, (2) S. Stock.

RAILWAY TRAINS REGULATION BILL.

Lord REDESDALE moved the second reading of this bill, and explained that its object was to enact that every railway company to which separate maximum fares have been granted for first, second, and third class passengers, shall provide separate and suitable carriages for all those classes, except in such trains as may be exempted by a special licence from the Railway Commissioners.

Lord HOUGHTON asked the House not to be influenced by any feelings of comfort or discomfort which they might have experienced, but to reject the bill on totally different grounds. He submitted that, by passing such a bill as this, Parliament would be interfering unnecessarily with that liberty of management by the railway companies which had been productive of so much public advantage. He moved that the bill be read a second time that day six months.

The Earl of DUNMORE said the objections he took to this bill of his noble friend the chairman of committees were many, as regarded both the principle of the bill and as regarded its details. First of all, Parliament had not yet thought it expedient (when by the private Act of a railway company the maximum charges which it was authorized to make had been fixed, and when a railway had once been opened for public traffic, after due inspection by a Government officer) to interfere in any way with the amount to be charged or with the facilities which were to be given by the railway company in exchange. It would, doubtless, be in the recollection of many of their lordships, that a bill was introduced by Mr. Plimsoll, in the other House of Parliament, some years ago, the provisions of which were to supply foot-warmers in the carriages for the benefit of the third-class passengers. Mr. Plimsoll was at once met by an objection to the principle of his bill (philanthropic though it may have been), for the same reason which applied in his estimation in very much greater force to the bill of the noble lord—viz, that the railway companies had obtained their Acts of Parliament subject to certain conditions which had been well weighed and well considered, both with regard to public as well as to private interests. The bargain had been concluded, Parliament had already sealed its conditions, and the shareholders had already invested their capital under those conditions, and it would not be right to impose additional responsibilities upon them. The bill of Mr. Plimsoll's was defeated in the other House of Parliament by a large majority, and since that time no measure had been brought before either House of Parliament, interfering in any way with the details of the working of railway companies, until this measure of the noble lord which was before their lordships House that night. The objections raised in the other House of Parliament to such a small measure as that of Mr. Plimsoll's naturally applied with much greater force to the bill then before their lordships. The real question at issue was this—At what point should parliamentary interference with the details of the working of railways commence?

After some remarks from Lords RELPER and CARLINGFORD, the House divided. The numbers were—

For the second reading	24
Against it	56
Majority	—32

The bill was therefore lost.

THURSDAY, APRIL 29.

The South Staffordshire Water Bill was reported from the Select Committee, with amendments.

The Pemberton Local Board Bill was read a second time, and committed.

The Slough Water Bill, brought from the Commons, was read the first time, and referred to the examiners.

The Cleveland (Skelton) Gas Bill was returned from the Commons, with the amendments agreed to.

FRIDAY, APRIL 30.

POLLUTION OF RIVERS.

The Marquis of SALISBURY, on rising to call attention to the state of the law on the pollution of rivers, said the subject was one in which a large portion of the country took a deep interest, and which had occupied the attention of the country for a considerable time. It had been considered by more than one Royal Commission. One commission was appointed in 1865, and another, of which the late Sir William Denison was the chairman, and Professor Frankland was a member, was appointed in 1868. These commissions went all over the country and examined very carefully into the subject which was entrusted to them, and the result of their labours had been embodied in four elaborate reports before their lordships. The time had now arrived when some legislation ought to follow so much inquiry. In 1848 an Act of Parliament was passed in the interest of the public health, enacting that all localities should furnish a system of drainage. Drainage must be put somewhere. You could not put it in the air; you could not always put it on the land; and when you could not put it on the land, you necessarily put it into a river. The putting into rivers of the refuse of manufactories of all kinds—of dye-works, of paper-works, and, above all, of distilleries—had produced in many of our most useful streams a fearful condition of pollution. The grievance was a very real one, as was well known to noble lords who lived on the banks of polluted streams; but for the sake of others he might read one or two passages from the report of the Commission on the Pollution of Rivers, to show what was the evil and the necessity of applying a remedy. The noble marquis then quoted the evidence given before the commission with regard to the river Clyde, Glasgow, from which it appeared that the stench from that river produced sickness. There was another stream which was very celebrated in the history of England, and which ran near St. Helen's. A clergyman who lived near that stream said that the stench from it was not only offensive out of doors, but penetrated into every room of his house, even when the windows were shut; that its action was felt in the kitchen; that it turned all the copper vessels there almost blue. From the evidence of a lord of a manor on the banks of the Mersey it appeared that in summer that river emitted a very offensive smell. Similar evidence was given as to the river Calder, with the water of which a manufacturer wrote a letter, instead of with ink. As to a stream which flowed by Bradford, he remembered hearing before a committee of the House of Commons that it was so bad on one occasion that a light was applied to it and it burnt. A river near Durham, into which all the sewage of Durham was poured, emitted an offensive smell, especially when it was disturbed by the passage of boats. A river called Bourne, which flowed into the river near Durham, was at times as yellow as ochre and as thick as glue. He believed that nothing had so fearful an influence in the pollution of rivers as the product of distilleries. If their lordships could imagine the stench of the river Thames in the outbreak in which it indulged of 1858, and multiplied that stench by 36, they would have a fair idea of what the stench was which was produced by refuse from the distilleries of the favourite beverage of some people. As to the river at Manchester, he could testify from his visit to that city last winter that it was in a bad condition; and he was told by a high municipal authority that an unfortunate man tumbled into that river, and, before he could be rescued, swallowed a dose of the water, of which he died. This was a state of things which called for some action on the part of Parliament. There was no doubt that those who interfered with their neighbours rights below stream violated the law, but the law had hitherto been too weak to enforce the rights of those below stream. Another difficulty which was experienced with reference to the prevention of the pollution of rivers was the objection which some people had to being rated to pay for the expense of an improved drainage of a district. The drainage of a district was not a matter which could be entrusted to local authorities. In any legislation that Parliament might undertake on this subject, he belived the assistance of some machinery other than that of local jurisdiction should be sought. That was a point on which the bill that he intended to lay on their lordships table differed from others which had been brought forward. He proposed not to carry a case before any local tribunal—that was to say, any tribunal dependent on the local authorities. He was afraid that, in attaining that object, they must appeal to that other officer who, from small beginnings, had acquired an important position—he meant the county court judge. It was obvious that cases of this kind, which required immediate decision, could not be tried at the assizes, which in many cases only occurred twice in each year. For this reason it was proposed that offences under the bill should be taken to the county courts. The next question was as to the offences so to be dealt with, and in this respect the present bill would differ in a vital point from the measure introduced by Lord Shaftesbury in 1872, and afterwards taken up by the noble duke on the cross benches (the Duke of Cleveland). In the bill of 1872 ten standards were laid down in reference to the character and ingredients of matter which might be thrown into streams, and it was made an offence to transgress any of these standards. The difficulty that was felt with regard to these standards was that they struck too far, and that, on the one hand, they would include water flowing from perfectly innocent sources, while on the other they were not sufficiently stringent to affect the very nuisances against which the legislation was directed. His view was that, in dealing with nuisances, it was better to trust to the common sense of the tribunal to which the cases were referred than to lay down a number of unwieldy chemical tests. It was, therefore, proposed to forbid the pouring of filthy, noxious, and polluting liquids into streams, and to leave it to the county court judges to decide what liquids possessed the forbidden qualities. He would next define the offences which were to be guarded against by the bill. In the first place, it was absolutely forbidden to put solid matter into streams. With respect to sewage, it must either be freed from its polluting qualities or be kept out of the streams. With respect to liquids issuing from manufactories or mines, a distinction had been made between the various classes of offenders. Manufacturers or mineowners who, at the passing of the Act, poured or permitted liquids to flow into streams, and who had not done so for more than 12 years, would be bound to make it harmless within a space of two years or be absolutely forbidden to pour or allow it to flow into streams. With regard to those who might be said to have a longer prescription, the Government had felt that they could not well do more than prescribe absolutely that the offending persons should use the best available means for making the liquids harmless. In the majority of cases, he believed that this could be effectively done. The carrying of the Act into force would be entrusted to the rural sanitary authorities, with a power reserved to the Local Government Board to do the work in case the rural authorities failed in their duty. In addition to this the bill proposed that the sanitary authorities in drainage districts should be grouped into conservancy boards, as a better means of carrying out the provisions of the law. These were the principal provisions of the bill, and he hoped they would be sufficiently stringent to arrest the greater part of the existing mischief without at the same time being so stringent as to arouse an amount of resistance in the country which could not be overcome. At the same time, the Act would be administered by authorities not liable to be swayed by the passions or interests of their constituents, but anxious only to carry out the law and to preserve to all persons the right, which was as sacred as usage and habit could make any right, of using the waters of our rivers for all ordinary purposes, domestic and otherwise, to which they could be legitimately applied. The noble marquis concluded by laying upon the table a bill embodying the proposals contained in his speech, and moving that it be read the first time.

Earl FORTESCUE expressed satisfaction with the course taken by the Government in proposing to deal with an important question. He also observed that, in his opinion, the most economical and desirable mode of dealing with the sewage which now in many cases finds its way into our rivers and streams, was to use it in fertilizing the land by means of sewage farms or otherwise. This plan had been adopted in France, and had been attended with great success. That sewage could not only be rendered innocuous, but made a source of wealth to the country, had been proved; and he therefore impressed upon the Government the desirability of affording facilities for its application to agriculture. He thought compulsory powers should be granted for its conveyance through land to places where it might be required for irrigation purposes, compensation, of course, being allowed under the usual conditions.

The bill was then read a first time.

The LORD CHANCELLOR acquainted the House that no further Standing Orders are applicable to the Ashton-under-Lyne, Stalybridge, and Dukinfield District Water Bill; and that the Standing Order applicable to the Gas and Water Orders Confirmation Bill has not been complied with.

The Carmarthen Gas Bill was reported, with amendments.

The Longton Gas Bill was read the third time, and passed.

The Bradford Water and Improvement, the Millom Gas and Water, and the Rochdale Improvement Bills, brought from the Commons, were read the first time, and referred to the examiners.

A petition was presented for an additional provision in the South Staffordshire Water Bill, together with the proposed clauses annexed thereto; referred to the examiners.

The Truro Water, and Pontypridd Water Bills were referred to a Select Committee, consisting of Lord Winmarleigh (chairman), Earl Amherst, Viscount Powerscourt, Lord Wolverton, and Lord Lisgar; to meet on Monday, May 3

HOUSE OF COMMONS.

MONDAY, APRIL 26, 1875.

The Alford Gas and Portishead District Water Bills were read the third time, and passed.

The Bradford Water and Improvement, Chelsea Water, and Rochdale Improvement Bills, as amended, were considered; to be read the third time.

The Millom Gas and Water Bill, as amended, was considered, clause added, amendments made; to be read the third time.

On the motion of Sir CHARLES FORSTER, it was ordered that the minutes of the evidence taken before the committee on the Stockton, Middlesbrough, and Yarm Water Bill, in session 1858, be referred to the committee on the Stockton and Middlesbrough Water Bill.

BURGHS AND POPULOUS PLACES (SCOTLAND) GAS SUPPLY (No. 2) BILL.—The second reading of this bill was deferred from the 4th of May till Tuesday, the 25th of May.

The petitions have been withdrawn of the South-Eastern Railway Company against the Tunbridge Wells Gas Bill, and of Mrs. Marion Paterson, of Armour, and others, against the Busby Water Bill.

TUESDAY, APRIL 27.

The Lords amendments to the Cleveland (Skelton) Gas Bill were agreed to.

The Slough Water Bill was read the third time, and passed.

The Waterford Improvement Bill was reported.

A report was presented that no Standing Orders, not previously inquired into, are applicable to the Cardiff Improvement Bill (Lords). Bill to be read a second time.

METROPOLIS WATER SUPPLY AND FIRE PREVENTION BILL.—The second reading of this bill was deferred from May 18 to Tuesday, May 25.

The petition of Alexander Macdonald against the Hamilton Water Bill was withdrawn.

The Southampton Corporation Gas (Purchase, &c.), Broadstairs Water (No. 1), Broadstairs Water (No. 2), and Margate Consumers Gas Bills were referred to a committee, consisting of Sir William Stirling Maxwell (chairman), Mr. Foljambe, Lord Muncaster, and Mr. Estcourt; to meet on Tuesday, May 4.

WEDNESDAY, APRIL 28.

The Longwood Gas Bill, as amended, was considered, amendment made; bill to be read the third time.

The Pontefract Borough Extension, Rotherham Corporation, and Stroud Water Bills, as amended, were considered; to be read the third time.

The petition has been withdrawn of Messrs. Colin Dunlop and Co. against the Hamilton Water Bill.

THURSDAY, APRIL 29.

The Bradford Water and Improvement, the Millom Gas and Water, and the Rochdale Improvement Bills were read the third time, and passed.

The Newport (Monmouthshire) Gas Bill was reported; report to lie upon the table.

The Birmingham (Corporation) Water Bill was specially reported from the committee.

The Inverness Water and Gas Bill (Lords) was read the first time, and referred to the Examiners of Petitions for Private Bills.

BIRMINGHAM (CORPORATION) WATER BILL.

MR. WILLIAM HENRY GLADSTONE reported from the committee on group C of private bills: That in the case of the Birmingham (Corporation) Water Bill they had agreed to the following special report:—"Your committee have to report to the House that the 63rd section of the Birmingham Improvement Act, 1851, by which it is enacted 'that no application shall be made to Parliament by the council for further powers, or for power to raise further sums of money for the purposes of that Act, or for the purposes of any further or other Act, until the council shall, by notice given for two consecutive weeks in at least two of the newspapers published in the borough, have called a public meeting of the ratepayers of the borough, at which meeting the council of the borough shall cause to be stated the object of the intended application to Parliament, nor unless at such meeting the council shall be authorized by a majority of the ratepayers present at such meeting to make such application,' was not strictly complied with, and that the consent of the ratepayers was not formally obtained until the 26th of February, subsequent to the second reading of the bill. Your committee are of opinion that the promoters, in taking this course, had no intention of proceeding against the wishes of the ratepayers, or of evading the provisions of the Act of 1851, but that they did not call the ratepayers together at an earlier date because negotiations were in progress with the water company, on the issue of which the scheme to be submitted to the meeting would depend."

FRIDAY, APRIL 30.

The Worksop Water Bill, as amended, was considered; to be read the third time.

On the motion of Lord HENRY LENNOX, a copy was ordered of the letter from Mr. J. R. Wigham to Her Majesty's Office of Works, in reference to the report by Mr. Douglass on the comparative merits of the signal-lights used on the clock tower of the Houses of Parliament during the session of 1873, in continuation of Parliamentary Paper No. 103 of session 1874.

A petition against the Cardiff Improvement Bill (Lords) was presented from the Great Western Railway Company.

HOUSE OF COMMONS COMMITTEES

THURSDAY, APRIL 8.

(*Before Mr.* BAILLIE COCHRANE, *Chairman*; *Mr.* WELLS, *Mr.* YEAMAN, *and Mr.* DICKSON.)

PETERBOROUGH WATER BILL.

Mr. LITTLER, Q.C., and Mr. P. STEPHENS appeared for the promoters; and Mr. SHIRESS WILL for the Corporation of Peterborough, who opposed the bill.

Mr. LITTLER said the bill as at present arranged would only enable the promoters to establish a permissive supply to the city of Peterborough; but it would incidentally effect a great good for the city, and a great good with regard to certain places outside. The condition of the district was this: there were commissioners who had control over the water supply, which was derived from the river Nene, and was acknowledged to be a very bad one. Up to Peterborough the river Nene was navigable. The condition of things in the vicinity of Peterborough really was that the town had no water supply at all worth mentioning. There were the London and North-Western, the Great Northern, and Great Eastern Railway Companies, and they all had to get their water from the river Nene, extracting 700,000 gallons a day from it. The fact was that the water supply of the companies for the large trade carried on there was threatened by the River Nene Commissioners. There was a population outside who were very much dependent also for water upon that river. It being known that Peterborough was at present very badly supplied with water, it was thought that a benefit was being conferred by this bill on the whole city of Peterborough and the places in the vicinity by the scheme of the promoters. The corporation, however, thought otherwise. They thought they ought to find their own supply from another source, and the inhabitants were determined to support the corporation. The promoters had provided in the bill for a supply of water up to the city limit, so that if the corporation thought they ought to have their supply from the promoters, they would be able to make arrangements with them for such supply and for working their own district in their own way. The scheme proposed did not interfere with the corporation scheme if they preferred to carry their scheme out, for it was proposed by the corporation to bring their supply from the other side of the city. The scheme was one of great public utility to the railway companies and to the population. The outlying villages would also be well supplied by it. Under those circumstances he hoped the committee would see fit to signify that they considered the preamble of the bill to be proved.

Mr. *William Shelford*, examined by Mr. LITTLER.

I am a civil engineer, a member of the Institute of Civil Engineers, and the senior partner of the firm of Shelford and Robinson, and have had 22 years experience in water engineering. I have been largely concerned in water-works at Glasgow, Hamilton, Dumbarton, Bath, and Chichester; at the latter place there are works which I am now completing. I have been acquainted with Peterborough since 1856. From 1856 to 1859 I was resident engineer of works at Peterborough under the chief engineer. I am well acquainted with the surrounding district. My general business throughout the district has brought me into contact with a large number of people, and made me acquainted with the general water-bearing capacity of the locality. There are large level areas in the Fen district which are used for the purpose of grazing cattle, and these depend on a supply of water from the river Nene. Peterborough is a very large centre for grain, cattle, and agricultural produce. At the present time, in consequence of some conflicting interests, the arrangements for dividing the fresh water from the salt are forcibly removed, and now the salt water goes up to within three miles of Peterborough. The villages round Peterborough are very badly supplied with water. The condition of things is this: in the summer time, when there is very little fresh water in the Nene, the custom is to let in the salt water to dam back the fresh water; in consequence, a large quantity of water becomes brackish, which is very bad for the cattle. There is nothing in the bill relating to the city of Peterborough, everything relating to the city has been struck out. The line of pipes goes only up to the city boundary. An objection was taken to the *locus standi* of the Corporation of Peterborough, and after it had been argued by Mr. Will and Mr. Stephen, the decision was, "The *locus standi* is allowed against so much of the bill as affects the jurisdiction of the Mayor and Corporation of Peterborough." The railway companies are depending on the river Nene for their water supply. The estimated abstraction of water by the three companies is 700,000 gallons per day. The Nene Commissioners are not only objecting, but instituting proceedings in Chancery to stop that abstraction. One of the objects of this bill is that the railways may have a good supply. There is no part of our works that in any way enters within the jurisdiction of the City of Peterborough. The source of our proposed supply is the village of Braceborough, and it terminates just outside the city of Peterborough. It is intended to supply the various villages in its course, and deliver 750,000 gallons per day at the boundary of the borough of Peterborough, which can be taken either by the corporation or by the railway companies. The railway companies are supplied now by the river Nene. The advantage is, that instead of the water now abstracted from the river Nene, there will be a supply from a source at Braceborough, which is acknowledged to be a better source of supply for the purpose. It is a better supply in this way: the railway companies supply not only their engines, but the hotels and their workmen's cottages from the river Nene; and immediately above their intake there is a large sewer, and the sewage flows into their pumps, and through the summer and autumn it is reported in the public prints that typhoid fever existed there, and that is supposed to be due to the bad water. There is no doubt that the water from the river Nene is unfit for the purposes of domestic supply, there are no means for filtration. The water at Braceborough has a notoriety for being remarkably good. If our scheme is carried out the corporation will be free to take the water or leave it.

By the CHAIRMAN: We propose for our mains to stop at about a mile from the centre of the city of Peterborough. The expense of our scheme will be £45,000.

Mr. WILL said it was evident that the promoters wanted to take away the best customers of the corporation, the railway companies, by a side wind. The borough was in course of carrying out a scheme of their own by bringing water from a source on the other side of the city, and they naturally looked to the custom of the railway companies to recoup them for the expense to which they would necessarily be put. He understood also that the supply of water from the river Nene belonged to the corporation.

Mr. LITTLER said it was not so, the supply belonged to the commissioners of the river Nene, who were threatening the railway companies for taking the water from that river.

In answer to the REFEREE: The source is nearly on a level with the higher part of the borough of Peterborough. The end of the conduit is at the same level as the source of supply. The pumping is required to give sufficient flow to the water. The estimated power for purifying 750,000 gallons per day is 85-horse power.

Mr. *S. B. Sharpe*, examined by Mr. P. STEPHENS.

I reside at Market Deeping. That is one of the places named within our limits of supply. I am a solicitor at Market Deeping, and a resident. The present quality of our water supply is decidedly bad. For some few years the pumps have been in a bad state, and contain a large quantity of organic matter. About three years ago a violent typhoid fever broke out in the place, and it was considered to be mainly due to the pumps. Several people died. A relative of mine was one, and it was considered by the physicians that it was due to the bad water from the pump in the garden. The water was analyzed and found to be exceedingly bad. There is a strong feeling in Market Deeping with regard to the present supply, and they wish the character of the water to be improved; the medical men especially wish for a better supply. I know the district generally which it is proposed to supply. If the proposed suppiy of water were taken to Market Deeping there is one brewer, I know, who would take it to brew with, but whether the inhabitants generally would take it I cannot say. I should say it would be taken by most of the people of the place. I think that if the opportunity afforded by this bill of getting a good supply of water were lost, it would be a serious thing for the district. I do think it is a scheme which is entitled to be viewed favourably by the people of the district.

By the CHAIRMAN: I know the source from which it is proposed to take the water, and I should say that you cannot find better water in England, it is a pure spring. My experience is, that illness follows from the present state of the water supply. The pumps are very bad.

Mr. LITTLER recapitulated the advantages of the bill, and pointed out that as the corporation proposed to bring their supply from the other side of the city to that on which the promoters pipes would be laid, if this bill were not passed all the villages along the proposed course would be left entirely unsupplied.

The room was cleared for the consideration of the committee, and, on the readmission of the parties,

The CHAIRMAN said the committee were unanimously of opinion that the preamble of the bill had not been proved.

Mr. WILL applied for costs, on the ground that his clients had been subject to a proceeding most vexatious and unreasonable on the part of the promoters.

The CHAIRMAN said the committee considered that it was not a case for costs.

MONDAY, APRIL 12.

LONGWOOD GAS BILL.

Mr. G. SOMERSET, Q.C., Mr. LITTLER, Q.C., and Mr. ATKINSON appeared for the promoters; Mr. EWINS BENNETT for the Corporation of Huddersfield; Mr. POPE, Q.C., and Mr. LEDGARD for the Slaithwaite Gas Company and the inhabitants of Golcar and Linthwaite; Mr. DUGDALE for Mr. Savile; and Mr. PEMBER, Q.C., for Messrs. Hirst, Hanson, and Sons, all of whom opposed the bill.

Mr. LITTLER said he appeared for the promoters, and their bill was "a bill for dissolving and reincorporating the Longwood Gas Company, and granting powers for supplying with gas the township of Longwood and certain neigbouring townships and places in the West Riding of the county of York." At present the company had an existence, but not a parliamentary one. It was started in 1859, being then but a small concern with a capital of £4000 in £5 shares; it now had a a capital of £24,000 in £5 shares, the larger portion of which was already fully paid up. The company proceeded in the first place to supply a certain number of places, and made an arrangement enabling them to store a comparatively small quantity of gas. The first holder would only enable them to store 70,000 feet of gas. The district which it was proposed to supply was one of those districts which are so rapidly increasing in Yorkshire, near Huddersfield. A large number of mills had sprung up, and houses and shops of all kinds, and the total number of the population within the district was nearly 14,000. It would still go on increasing even in a greater degree. It was not an ordinary but an extraordinary population, as a large number of mills and large works of various kinds depended on the gas-works for their supply of gas. The present condition of things was that the district had been supplied by the company since 1859, and had reduced their price from 6s. 3d. to 4s. 6d. per 1000 cubic feet. That was not an excessive sum for a company which had no parliamentary limits given to it. The business had now become so large, that it was impossible, looking to the amount of capital invested, to do without parliamentary powers. A very large increase of the works was needed, and that being so, it would be impossible to raise the capital needed in a satisfactory manner unless the company had the protection of an Act of Parliament.

Mr. SOMERSET, who apologized to the committee for his unavoidable absence, then continued the argument of Mr. Littler on behalf of the company, and said he would go at once into what was proposed to be done. The company had been established in order to supply gas to Longwood, Golcar, Lindley-cum-Quarmby, and Stainland; but gas had also been supplied to Linthwaite. The portion of the bill relating to the supply to Longwood (which, as shown upon the map, was a considerable portion of the district) was unopposed. All the districts above named had been supplied by the company since 1859. With a nominal capital of £24,000, £18,900 had been expended, and £5360 borrowed on promissory notes. Every year and every month the necessity for a further supply increased in the district. It was found absolutely necessary for the requirements of the district to come to Parliament to ask for parliamentary powers, and that was an advantage, not only to the company but the public, because it put the company under restrictions, compelling them to supply pure gas, and so forth. Taking the old capital at £24,000, it was proposed to raise £20,000 additional new capital, making a total of £44,000. The old capital would pay 10 per cent. and the new 7 per cent., if it were ordinary, and 6 per cent. if it were issued in any other form; it was also sought to have borrowing powers of £6000 with regard to the old capital of £24,000, and £5000 with regard to the new capital of £20,000; therefore, the total capital would be £44,000, with borrowing powers for £11,000. The increase in the consumption of gas in the district was very great indeed. In 1862 there were 297 meters, and the gas consumed was 1,545,000 cubic feet; and in 1874 there were 1050 meters, and the gas consumed was 13,545,000 cubic feet. The proportionate increase since was still greater. As to price, for some years it was 6s. per 1000 cubic feet, in 1872 it was 5s., and now only 4s. 6d. was charged. The dividend for some years was nothing, then for five or six years they got 4 per cent., then for three years 10 per cent., then they came down to 6 for two years. Since then they had paid 8, except one year, when they had the advantage of a bonus. Some time ago the company bought the gas-works belonging to Messrs. Armitage, who were large millowners, and who had for some time supplied themselves and many of their neighbours with gas, but who found that the requirements of the district were increasing to an extent that made it impossible for them, with their existing works, to supply it properly. In 1865 Messrs. Armitage's receipts were £414; but in 1873 they were £1424; therefore, in their small district a great increase had taken place in the consumption of gas. The increase in the population had brought the amount up to 17,000. As to the petitions against the bill, he would take first that of the Slaithwaite Gas Company. They had appeared before the referees, and sought to be heard against the bill, but without success. It was shown that they were supplying Golcar and Linthwaite as a pretence. They supplied just a little portion of the district, got a good profit out of it, and the court of referees decided to limit them to that. The decision was, "The *locus standi* is allowed as to so much of the bill as affects those parts of the township of Linthwaite and Golcar, which are now supplied with gas by the petitioners." Three companies were in Golcar already, and were supplying it—they are only on the borders—and the inhabitants ought to have the benefit of a supply of gas from a company properly established by Act of Parliament. As to any of their mains and pipes, the company would not interfere with them. They allege that the bill is not promoted in the interests of the public, but of the Longwood Gas Company. That he would prove to be quite the contrary. The petitioners alleged that they were first in the field, but then the truth was they could not properly supply the district. As to their allegation that the company would, on obtaining the power sought, interfere with their mains, the company were willing to insert in the bill the provision which was accepted by Mr. Fielding in the Todmorden case, that they would not interfere with those mains and pipes. If the petitioners insisted

on their right to this little district, the company were willing to buy their interest at a reasonable price on arbitration terms, subject to the committee's permission. Then as to the petition of the freeholders, householders, occupiers, and consumers in the townships of Golcar and Linthwaite, in the West Riding of the county of York, including the Local Board of Health of Linthwaite. That petitition (including ladies) made only 116 persons, whereas the number of persons in Golcar and Linthwaite supplied by the company was upwards of 11,000. It was a very significant fact that only 116 persons could be found to sign the petition, especially when it was found to be the fact that some who had signed did not live in the district supplied by the Slaithwaite Gas Company, but in some other part of the district. They say they may be deprived of the present supply from Slaithwaite; but we cannot prevent their going to that company for their gas if they choose to do so. That was what the Slaithwaite Gas Company were afraid of their doing; and they were no doubt the chief movers in that petition of the inhabitants. If we charge 4s. 6d., they may come to us and leave the Slaithwiate Company. They say that some of them have great need of gas in their manufactories, and any interference with their supply would be a great loss. There the Longwood Company quite agreed with them; the consumption of gas has increased throughout the district, and the Longwood Gas Company wished to increase the supply. In the petition it was said that the financial provisions in the bill were unsatisfactory. That would be shown not to be the case. It was said that the streets of Golcar were very well lighted. That was pleasant to hear, for some of the streets were lighted by the promoters. As to quality, there were stringent rules in the general Act relating to purity, and so on. With regard to the petition of Mr. Savile, it was a question of a piece of land which the company sought to take under compulsory powers. He believed Mr. Savile had no possible objection to the bill, but allowed himself to be a petitioner from a desire to show respect to his tenant, Mr. Hanson, of Hirst, Hanson, and Co. Then came the petition of William Edwards Hirst and others. They said it was contrary to the principle and practice of Parliament to confer upon a gas company compulsory powers for the purchase of land, except under exceptional circumstances, such as did not exist here. That was an allegation which could not be admitted, for there were very exceptional circumstances in the case. If the gas-works were not erected on the site proposed, no more convenient site could be found. The petitioners say the present value of their land is £100,000, and the whole of such land is essential to them; but it would be shown that such was not the case. They spoke of plans having been prepared, and buildings begun. The fact was that when the company talked of buying the land, bricks and other materials were placed there for the first time, to make a show of building work going on. The petitioners stated that they were part freeholders and part lessees of property at Fern Lee and Cliffe End Mills, all within a short distance of the new gas land described in the bill. He was informed that Fern Lee could not be seen from the gas-works, nor could the gas-works be seen from it. It was not at all likely that the property would be injured in any way. The petitioners say that the works will greatly increase the annoyance and injury to which they are already subject from the company's works. How that would be he could not tell, when Mr. Hanson actually attempted to get up rival gas-works, which were to be placed on a site close to the one proposed by us. They said the quality of the gas is unsatisfactory, but it was 14-candle gas. They alleged that we should have by the bill power to break up certain roads, which powers were not covered by the newspaper notice. The examiner reported that such non-compliance had been established, the powers of the company over that portion were struck out, and, in consequence, a certain portion of Longwood would be without gas. But the local authorities would allow the company to carry gas there. Then it was said that the company had been repeatedly applied to by the consumers of their gas to improve its quality and lower its price. The company had never had such complaints, save by one gentleman, and that was since the present bill had been proposed. As to the London and North-Western Railway, with them the corporation had come to an agreement. The Corporation of Huddersfield said that in 1861 a bill was promoted, which was opposed by the Longwood Company, and an agreement was come to between the companies, whereby the Huddersfield Company agreed not to supply gas within a small portion of the town of Linthwaite. The Longwood Company arose from the refusal of the Huddersfield Gas Company in 1858-9 to supply parties in Quarmby. Some parties in that place offered all sorts of terms for gas, but they could not and would not supply it—it would not pay. The Longwood Company then came into existence. What they have done would be shown by evidence, and now the Huddersfield Corporation came and said they ought to step in and reap what the promoters had sown. There was a deed of agreement between the Huddersfield Gas Company and the Longwood Gas Company, dated Feb. 11, 1861, in consideration of which the Longwood Gas Company withdrew their opposition, and the bill passed; and the point of that agreement was this, that the Huddersfield Gas Company should supply the borough, except Quarmby, which should be supplied by the Longwood Company. The importance of the agreement was that the Huddersfield Gas Company were precluded for ever from supplying Quarmby, and that it was handed over to the Longwood Company in perpetuity, the company giving the consideration that they would confine themselves to Quarmby. Huddersfield became incorporated in 1868; in 1871 it got, by an improvement bill, power to buy gas-works within the borough of Huddersfield, and it bought the Huddersfield Gas-Works, and in the deed of sale were recited the very terms and liabilities of that agreement; nor would the corporation deny that they were bound as strictly as anybody could be in honour, truth, and law by their agreement, and he would wait with some curiosity to know how they could oppose the proposed bill. Some little light had been thrown upon the conduct of the Huddersfield Corporation by this, that it is said they intend, some day or other, to include within their municipal borough, if possible, Linthwaite, Golcar, and so on; in fact, that love of empire had seized Huddersfield which seizes other places, and they thought that, if any one obtained powers for gas over any district outside Huddersfield, when they came for that extension of limits the opposition would probably be much more severe than they expected now. That was the secret of the opposition of the Corporation of Huddersfield to the proposed bill. They said, "No parliamentary sanction was sought or obtained for this agreement, but the bill was amended by the Huddersfield Company by defining its limits of supply in accordance therewith, and passed in its amended form;" but he could not suppose that the Huddersfield Corporation would say that they were not morally and legally bound by that agreement. In their petition it was alleged that the Longwood Company charged 4s. 6d. and Huddersfield 3s. 9d. That was an error—they charged 4s., and that was their maximum charge within the borough. To places a mile off they had power to charge 5s., and, as their affairs were not very prosperous, and Quarmby was more than a mile away, they would, no doubt, charge them 5s. instead of 4s. 6d. as charged by the Longwood Company. They charged the company with not having supplied the inhabitants of Quarmby satisfactorily with gas. That he would meet with a decided negative. No complaints had been heard of until the proposed bill came out, and then only from one gentleman. They asserted that the charge made by the company for gas supplied to public lamps in the said district was higher than what was charged by the petitioners in other parts of the borough; the fact was the company charged 42s. and the petitioners 40s., but that was a different thing to supplying an outlying district. He believed that, though the petitioners had been granted a technical *locus standi*, they neither legally nor morally could be permitted to break through their agreement. Though, therefore, the committee might hear them, he felt satisfied that he would be allowed to ask how they could pretend to oppose the company, as it was perfectly clear they never could supply gas in that district, except by deviating from their agreement in a way that had never been allowed by Parliament.

Mr. *A. H. Owen*, examined by Mr. ATKINSON.

I am solicitor to the promoters and to the Longwood Gas Company, and have been ever since their formation in 1859. I produce the Certificate and Memorandum of Association of that company; also the lease of the company. There are no Articles of Association; they form part of Schedule B to the Act in force. I produce the lease to the trustees for the company, and an assignment by the trustees to the registered company; also the agreement between the Huddersfield Gas Company and the Longwood Gas Company that was made on the passing of the Act of 1861.

TUESDAY, APRIL 13.

Mr. *A. H. Owen* recalled, and cross-examined by Mr. LEDGARD.

I have not been secretary but solicitor to the company since its incorporation. I have conducted the correspondence on behalf of my company with Mr. Sykes, the solicitor to the Slaithwaite Gas Company. I do not attend the board meetings, except the special ones for parliamentary purposes. I was not present when the deputation from the Slaithwaite Gas Company attended our board meeting with reference to this bill, nor do I know of it except through the correspondence. I am not aware that the Slaithwaite Gas Company sent a deputation to the Longwood Company to confer with them as to what they considered to be the injustice of the Longwood Company in extending their business into the opposing district. I did send a letter to Mr. Sykes saying that we were going to oppose the Slaithwaite petition before the referees, and asking to be informed as to what they sought to obtain. That letter was approved by our board. The letter meant what Mr. Somerset said, that we should go into the Slaithwaite district and purchase, if necessary, by arbitration; it was also an invitation for the Slaithwaite Company to communicate what they really wanted. We thought they would be at great expense, and wanted to recoup them. I was certainly in hopes that we might buy such of the pipes as we wanted, and leave them with the rest. I afterwards received a letter of the 1st of March from Mr. Sykes, saying that he should oppose the bill altogether. Then I wrote acknowledging that, and asking for a more satisfactory reply. Mr. Sykes wrote back saying he thought I did not quite understand the relative position of the two parties. My first letter was a serious proposition. That contains the only proposition which we have made, except the one made by Mr. Somerset as to arbitration. I brought that offer under the notice of our board, and it had their approval. I have not been instructed by our board to make any other proposition to the Slaithwaite Gas Company. I have, as solicitor, been advising our Parliamentary Committee with reference to the bill. As such I considered the Slaithwaite petition. Notwithstanding what is said in the 16th paragraph, my directors have not ordered me to make any other proposition to the Slaithwaite Committee.

Re-examined by Mr. SOMERSET: The directors are prepared to carry out fully the terms which they have proposed. We offer them now, because we think them fair and reasonable. In my letter I intended that they should suggest terms, which our board should consider.

Mr. *Starkey*, M.P., examined by Mr. ATKINSON.

I reside at Heath Hill, near Wakefield. I am one of the members representing the southern division of the West Riding of Yorkshire. I know the district which it is proposed to supply with gas. I am a member of the firm of Starkey Brothers, but our works, though not within the limits, are in the same valley. I have known the district all my life. I am well acquainted with the valley of the Colne. It is a fact that, during the last 15 years, there has been a great increase of factories and other buildings, and in the trade generally of the district. That has caused an increase in the number of houses and cottages, which brings a great increase in the number of the population. It is necessary that there should be a constant supply of gas in the district. I do not know anything about the bill before the committee.

Cross-examined by Mr. PEMBER: I could not say whether the power of manufacture and storeage which this company possesses is or is not in excess of the demand. That would be an element to take into one's consideration. If they could manufacture gas to a larger amount than is required in Linthwaite, that might do away with the necessity for the proposed works. I have not considered whether the promoters could increase their works if they wished to do so; nor what plot of land is most suited for the proposed works; nor how it would affect Messrs. Hirst and Co.

By Mr. LEDGARD: I have no object, in giving evidence, further than to be of service to my constituents. I should say the whole district is interested in the Longwood Gas Company. The points which I have considered are, that the district is an increasing and populous one, and that it is necessary that there should be an abundant supply of gas. There has been a tenfold increase in the district north and west of the Colne. I know that in Golcar the land rises. I cannot say that the increase has been more in the direction of Huddersfield. I only know Slaithwaite generally. I have formed no opinion as to the necessity for another gas company.

Re-examined by Mr. SOMERSET: The population in the district over which the bill seeks parliamentary powers has increased tenfold. I have Slaithwaite among my constituents.

Mr. *J. Taylor Armitage*, examined by Mr. SOMERSET.

I am a justice of the peace, and deputy-lieutenant for the West Riding of the county of York. I reside at Berkeley, near Huddersfield, two miles from the gas district. I am a partner in the firm of Armitage Brothers, large manufacturers at Milnsbridge. Milnsbridge is in Linthwaite. Our works are within the proposed limits. I am not acquainted with the district individually, I have been so much in London. We had some gas-works, and last year we disposed of them to the Longwood Company. That was because we found the consumption of gas to be so increasing in the district that we could not supply it without going to an expense of several thousand pounds. We had no parliamentary powers. As to the increase of works and houses, on my own property there have been five mills built within the last few years, and a short distance off many houses to accommodate the workpeople. I have considerable property in the district. My brother has a great deal also, and is laying it out for building purposes and letting it very fast. The population is increasing very much indeed. I think that parliamentary powers are needed to supply the large amount of gas required in the district. I am a shareholder in the company.

Cross-examined by Mr. PEMBER: There are five Armitages who are shareholders in the company—Mr. George Armitage, Mr. Edward Armitage, Mr. Joseph Armitage Armitage, Mr. Alfred Armitage, and myself. We did sell our gas-works to the company. They were at Milnsbridge, near the Longwood Gas Company. I do not think there is room on our land for any increase of the company's works. I have only two acres not built upon. We have about half an acre of land where the gas-works are. I cannot say what amount of gas we have supplied from our works. When we sold our gas-works to the company we did agree that in 12 or 14 years they should remove them from our land. I do not know that the company propose to place their works compulsorily on Messrs. Hirst's land. I only came here to speak to the requirements of the district. I do not know that the company's power of storing and supplying gas is beyond what they have to supply. I think they do require more storing power; I believe they have not storeage for 24 hours supply. I am not here to say that it is necessary for the company to have Messrs. Hirst's land as a site for their works. I do not know that it is an unusual thing for a gas

company to have compulsory power to purchase land. I do not know whether there are other sites available.

By Mr. LEDGARD: I am not a director of the Longwood Gas Company. I know nothing of the working of that company, or of our own before we sold it. I came here because I was asked to come. I know the district has increased in every respect. I do not know whether the millowners are sufficiently supplied by the Slaithwaite Gas Company.

By Mr. BENNETT: I reside in the district, and came to London on business. I know that the pipes of the water company pass through Longwood. I do not know that the water-works supply of Quarmby is directed by the Corporation of Huddersfield. I believe the management of the sewage in Quarmby is directed by the Corporation of Huddersfield. I could not say as to the desirability of the gas supply of Quarmby being under the direction of the corporation.

Re-examined by Mr. SOMERSET: I have considerable property in Linthwaite, which has been built upon very much of late years, and I think gas is required.

Mr. *Charles Hall*, examined by Mr. ATKINSON.

I served two notices on Feb. 17, one to James Kaye and the other to John Taylor.

Mr. *Edward Armitage*, examined by Mr. SOMERSET.

I live at Edgiton, near Huddersfield. I am partner with the last witness but one in the works of which he spoke. I am president of the Hudderfield Chamber of Commerce. I have managed our works for nearly 40 years. I have considerable property in the proposed district. It has been much built upon lately, and the buildings and, consequently, the population are still increasing I have only two or three acres of land unoccupied. The properties of Mr. Savile and Sir Joseph Radcliffe are well adapted for building. There have been 15 mills erected on the different properties, and the population has been doubled within the last ten years. Our works at Milnsbridge are partly in Linthwaite and partly in Longwood. I expect, from the state of trade in the district, that there will be a still further increase in the population. I cannot see how the proposed works will create a nuisance on Mr. Savile's land, and prevent building there. I superintended the management of our gas-works. We sold them to the Longwood Gas Company because we could not supply the increasing demands of the district without a very large outlay. I am a shareholder of the company, and have been since 1866. I am also a director. The district we supplied was about half a mile all round from the works, with the exception of the Huddersfield side, in which directiou it did not go so far. Our receipts for gas in 1865 were £545, and in 1873, £1424. Our charges were, in 1855 and 1856, 7s. 6d.; in 1857, 7s.; in 1858 and 1859, 6s. 8d.; in 1860 and 1862, 6s.; from 1863 to 1871, 5s. 5d.; in 1872, 5s.; in 1873, 5s. 6d.; and in 1874, 4s. 6d. We supplied gas long before 1855. Our works were erected in 1835. I think 6s. is a reasonable maximum to fix. To charge as low as we can is a good policy, but we must provide for contingencies. The Huddersfield Corporation have charged their maximum of 4s.; when they go a mile from the market they can charge 5s., and they do so. Quarmby is more than a mile. 5s. 8d. to 5s. 10d. is charged by other parties in the district. Fourteen candles is a good standard. I know of what occurred between the Slaithwaite and Longwood Companies. I agree with Mr. Owen as to the reasonableness of the proposals made by the Longwood Company.

Cross-examined by Mr. LEDGARD: I had the entire management of our private gas-works. They supplied a portion of Linthwaite, where there are a large number of mills. Our mains did not extend so far as the mains of the Longwood Company. We supplied the portion of Linthwaite nearest Huddersfield. The distance between our nearest main and Slaithwaite is 1¼ mile. The reason we transferred our works was that we could not supply the increased demands. We could not supply a sufficient quantity. I am not aware that we had had complaints as to quality and price. I do not know of a public meeting of the ratepayers on the 4th of February to oppose this bill. Mr. Haigh Dyson is the chairman of our company. There has been a great extension of mills and manufactories in the valley of the Colne, especially in the direction of Slaithwaite. The mains of the Longwood Gas Company extend in the direction of Slaithwaite in Linthwaite as far as the toll-bar at Spring Mill. In Golcar the mains of the Longwood Gas Company go as far as St. John's Church. We have sought power in the bill over part of Linthwaite and the whole of Golcar, because we thought it was required by the public. We have had some requisitions from Upper Linthwaite. I do not know that we have had any from Golcar. I do not, of my own knowledge, know of any mill, manufactory, church, public or other building which is not supplied with gas by the Slaithwaite Gas Company. I have not heard of any requisition asking to be supplied by us. No millowner has complained to us that he cannot get gas from the Slaithwaite Gas Company. I am aware that the Linthwaite Local Board of Health have petitioned against this bill. I believe the Local Board of Health are the custodians of the road in Linthwaite. I was present when a deputation from the Slaithwaite Gas Company visited our board. They did complain of our seeking powers over their district. They did say it was a hardship upon them, and proposed that we should confine ourselves to the portions we already supplied. We did not accede to that; we declined. I am not aware of any offer made by the Longwood Board to the Slaithwaite Board beyond the offer made by Mr. Owen and the learned counsel. I cannot say as to the Slaithwaite Company increasing their supply at every fresh demand. I have never been at their works. I do not know what the capital of the Slaithwaite Gas Company is. I think 6s. a reasonable maximum. We have no wish to interfere with Slaithwaite, although we seek to go into their district. We have no wish to compete with them. Our object in going there is because a large portion of the district would not be supplied at all if we did not go there. I do not know that the Slaithwaite mains are nearer than ours.

By Mr. PEMBER: I know the land leased by Messrs. Hirst, Hanson, and Co. I know that they very much object to their land being taken. We seek their land because it is the most suitable in the district. We could not put a gasholder on the land at the north, because of the contour of the ground. We have examined the whole district to try and find another site, but cannot find one so suitable. The plot to the south is separated by the railway; it would be more costly to put works there, and we could not have the same control over them. I have heard that another gas company has bought that southern plot, but I do not believe it. I believe the people of Longwood are satisfied with the quality of our gas and the price. I have never heard of any complaints. I have heard of the proposal to start another company. I believe it is to annoy us. To my knowledge our present storeage capacity is not 150,000 feet. When we sold our works to the Longwood Gas Company, we did not stipulate that they should remove the works. They are going to remove part of them. I do not know that Mr. Hanson has a pleasant residence on that ground. Shires Mill, belonging to my brother, is too close to the river for gas-works, and the land is unsuitable.

Re-examined by Mr. SOMERSET: Shires Mill is a long way off. I know the water percolates there. Mr. Hanson would not see the gasholders from his house. He would be in exactly the same state as he is now as to smoke. What I have said is also the opinion of my co-directors. We certainly do not intend to interfere with the mains and pipes of the Slaithwaite Company.

Mr. *Jabez Shaw*, examined by Mr. LITTLER.

I am an accountant. I became secretary of the Longwood Gas Company in 1860. I continued secretary till 1873, when I became a director. I have a knowledge of the position and proceedings of the company all that time. The present nominal capital is £24,000; of that, 2906 are paid-up shares, and 1894 are shares issued, but with only 10s. a share paid upon them. We have not borrowed any money on mortgage or bonds—only on promissory notes to the amount of about £5000. We pay 5 per cent. on that. I know the land which the company at present hold from Sir Joseph Radcliffe for 999 years, from Nov. 1, 1859. On that land our works stand. The capital raisd has been faithfully applied in various additional buildings, and in laying mains where required. We began to supply in 1860, or earlier. Since that time the demand has been rapidly increasing. It is highly desirable that we should have an increase of our works. We cannot extend them on our present land. In the interests of the public they should be increased. I know all the valley of the Colne. Mills are increasing all along it, and large manufactories are being erected. The natural consequence has been to increase the population. At the present moment two mills and about 50 houses are being erected. In April, 1862, the number of consumers meters was 297, and the gas consumed 1,545,920 at 6s.; then the receipts for gas were £463 15s. 1d., the dividend being 4 per cent. In the next year there was no dividend. Then from that year the dividend varies from 10 per cent. to 6. In April, 1874, we had 7000 meters and 13,545,900 feet of gas consumed. Total receipts, £4068 11s., a dividend of 8 per cent., with a bonus of 12½ per cent. The price of gas to April, 1865, was 6s.; then 5s. 5d. until October, 1872; then it was 5s., and then 5s. 6d. to 1873; and in 1874 it was reduced to 4s. 6d. The limits with regard to Lindley-cum-Quarmby and Linthwaite are in accordance with the agreement made with the Huddersfield Company and our company, and the Huddersfield Gas Act of 1861. The limits are in accordance with the limits provided in the Act of 1861. I do not know of any land suitable except that which it is proposed to acquire. I think it is desirable that the maximum price should be 6s., because of the very possible increase in the price of labour and material, and also because of the nature of the district, it being a suburban one. We have 9½ miles of main at present. We have had no complaints from any one in Lindley-cum-Quarmby, with the exception of Mr. Rowland Hall; that was with regard to a main which was subsequently made right. Mr. Hanson has never complained to me about the gas; he has said, "Give us more pressure, and I will pay;" and then he complained that the amount was too great. His mains and meters were not satisfactory, but they are now.

Cross-examined by Mr. PEMBER: I think Mr. Hanson is unreasonable. He said we had charged him for 200,000 cubic feet more than he had had supplied to him. That question went to arbitration, or rather it was left to Mr. Hanson and Mr. Armitage. Mr. Hanson consented to that. That was not unreasonable. Our directors submitted to the reduction. A large portion of the limits we propose to supply are unsupplied altogether. We propose to supply Golcar and Linthwaite; that is an area of several miles. I do not know of any mills that are unsupplied. The consumption of 13,000,000 feet to April, 1874, was for one year. The heaviest outgo was in December, 1874, when it was 1,111,000 in a week, or about 200,000 a day. Our storeage capacity is very little over 100,000. It is not 147,000. The exact amount is 35,000 in one holder and 66,000 in another. The holder we bought of Messrs. Armitage we do not use; gas escapes from it. I cannot say how many thousand we can make per day; we have made more than 1,111,000 in a week. We can make more than that without using all our retorts. I do not think our manufacturing power is something short of 300,000 feet per day. We have 72 retorts. Twelve were out of use when we made the 1,111,000 in one week. The retorts are contained in beds. Some are double and some single. We could double them all by enlarging the building. That would give 30 new ones. That would give us a very large increase in our manufacturing power. It would then be pretty nearly 400,000 cubic feet a day. There was a deputation to our board a short time since. I do not know that there were any complaints. They wanted to have the price reduced, and to be supplied with 18 candles instead of 14. They did ask for a system of discounts or a greater discount. I do not remember that they asked for an agreement to be made for three years. Our reduction to 4s. 6d. was before, not since this bill was promoted. It was done in May, 1874. It was after the deputation. It is only since we applied for the bill that we have known of Mr. Hanson's unwillingness to part with his piece of land. Mr. Hanson has never, to my knowledge, pointed out any other sites of land. He has never spoken to me about it. I only know by hearsay that he has; we have had no notification of it in writing at our board. We did not take the plot of land to the south, because we never thought of it, and we do not now think it convenient. We looked at the land to the north, but the elevation is too great. It is 50 feet above the land belonging to Mr. Hanson, and 40 feet above the middle of our present works. I do not know of a plot of land near Messrs. Armitage's works. If we were to telescope our holders, it would increase our producing capacity. It would be an expensive matter, and not very safe. It would not be a more expensive matter than erecting new holders, but it would be very dangerous. I think so because of the violence of the wind. It is not an unusual thing to do. Our works are, we think, in an exposed position. Our works are not between Messrs. Hirst and Hanson's works and the railway; they are nearer the railway. The prevailing wind is south-south-west. I do not know what number of shares the Messrs. Armitage hold. There is a covenant for removing the gas-works from Messrs. Armitage's land—that before the end of the term they shall remove their present works. If removed before seven years the lease ends; at 21 years they must be moved at the option of the Longwood Gas Company. We have taken up a part of the retorts on that land. We do not manufacture gas there now, and never intended to do so. I cannot say when our company first heard of the mutual scheme. I cannot say whether it was August or September. I heard Mr. Hanson say they would have a mutual company, and put it in this very field which we propose to take. I cannot say where I heard that, but I did hear it. The Colne Valley Company is merely another name for the Mutual.

By Mr. LEDGARD: I am not aware that I heard that the Mutual Company was started by many of our old customers who were dissatisfied with our present supply. We have very rarely had complaints of the quality of our gas being bad. We have never, as far as I know, had complaints from the inhabitants of Linthwaite except one. I was not present at the meeting at Milnsbridge. The certificate of incorporation is in the room. Mr. Owen has it. I believe under our deed or Memorandum of Association in 1859 our company was formed with a view of supplying Golcar. The whole of Golcar was included, I believe, not a portion only—that is my impression. We have as a fact supplied a large part of Golcar; I believe our mains have been laid down for nearly 15 years. Within the last 15 years we have laid down 8-inch mains from Milnsbridge to supply large mills in Golcar. I have seen the limit proposed by the Slaithwaite Gas Company. I know Heath House Brook, our mains extend to within 200 or 300 yards of that. We have not had a requisition from any of the inhabitants of the neighbourhood. Within the last few years there has been a very large increase of mills in that locality. I do not know of any demands for gas except from mills. There are no large buildings in that locality. There are two mills there not supplied by the Slaithwaite Gas Company. Those two mills are supplied by a private firm. I believe our deed of association did not include any part of Linthwaite; nor did we have any powers there either by the deed of association or the Huddersfield Gas Act of 1861. Therefore whatever powers we seek there are sought for entirely by this bill. I do not know the line of division between upper and lower Linthwaite. I know from the bill that many of the inhabitants of Linthwaite are opposing it.

WEDNESDAY, APRIL 14.

Mr. SOMERSET said that happily the differences with the Corporation of Huddersfield had been settled, and they were now supporters of the Longwood Bill.

Mr. BENNETT who appeared for the Corporation of Huddersfield, said that

there had been a satisfactory settlement, and therefore the opposition of the corporation was withdrawn.

Mr. *Jabez Shaw* recalled, and cross-examined by Mr. PEMBER.

About 20 per cent. should be allowed for replenishment. The gasometer is constantly filling. At the end of the half day the gasometer has hardly refilled itself. Our manufacturing power is 50 per cent. in excess of our storage power. We cannot fill a gasometer as fast as we can empty it. We cannot produce 50 per cent. for consumption while it is going on. Our consumption goes on from three to six o'clock for the large amount, and to seven or eight for the smaller. The consumption begins a little before six in the morning, and goes on till eight, sometimes till noon, and in some cases all day. We light the streets for the same time. We must be prepared for the longest periods of lighting. I cannot say how many cubic feet we manufacture an hour. The land on the north-east belongs to Messrs. Armitage, it is partly occupied by gardens, and partly by Mr. Armitage's house.

Cross-examined by Mr. LEDGARD: We have a plan showing a portion of our mains, but not all. I am not at present the secretary of the company.

Re-examined by Mr. SOMERSET: I am not an engineer. Many of the questions which have been asked me are for engineers to answer. There is a solid embankment between our works and the land pointed out as belonging to Mr. Armitage. I find that Golcar is included in our district in the Memorandum of Association. We were formed to supply Longwood, Golcar, Lindley-cum-Quarmby, Stainland, and the places adjoining. We have been supplying Linthwaite, with the consent of the Linthwaite Local Board, and also Golcar. The Golcar Board are not petitioners against the bill. The population of Golcar was 6000 in 1874. We believe the 116 inhabitants who have petitioned against our bill live all over the district. We have had no complaints of any sort from the local board of Linthwaite. We had a complaint from one gentleman three or four years ago. I was secretary 12½ years. I say distinctly that that complaint was the only one made during the whole of that time. As far as I know we have never had any complaints from Golcar, unless it was from Messrs. Dyson. The gentleman who did complain was Mr. Rowland Hall, who complained of pressure. We have been singularly free from complaint. It was about last May, I think, that I first heard of the Mutual Gas Company. The parties who set on foot that company were, I understand, Mr. William Shaw, Mr. E. T. Sykes, Mr. Dyson, and another. I do not know whether the company is in existence; they have a sign in a window, "Colne Valley Gas Company, Limited." They have done nothing yet, to my knowledge. As a director, and not an engineer, I say that to telescope the gasholders would be impracticable and dangerous. We have instructed our engineers, and taken every pains to search through this district for sites, and the result is that we cannot find one at all suitable except the one proposed.

Mr. *Samuel Kenworthy*, examined by Mr. SOMERSET.

I live at Golcar. I was appointed secretary of the company on the 26th of June, 1873, and am still in that position. The present nominal capital of the company is £24,000, divided into 4800 shares of £5 each; 2930 shares have been fully paid up, making £14,650; upon 1870 shares 10s. per share has been paid, or £935; making the total paid up £15,585. We have also borrowed £5360 on promissory notes. I am acquainted with the land that it is proposed to take under this bill. I have accompanied the engineers to view the various sites. I know that they have advised that the site proposed is the only one suitable. The cost of the buildings, plant, &c., belonging to the company is £18,492 16s. 11d. I have known the district proposed to be supplied for more than 20 years. The Local Board of Golcar was appointed, I believe, in 1861. I have been surveyor of highways for that township. For the last 10 years I have been a member of the local board. From 1866 to 1870 I collected the income-tax in Golcar. I know Golcar and the whole district well. The population has increased very much during the last 10 years. Mills and cottages are being built at the present moment. The present gasholders can contain 125,000 cubic feet of gas. We have only three holders in use. We have a fourth, but it is leaky and out of use. It cannot be used without entire renewing. The highest amount of gas ever sent out is 220,000 feet in 24 hours. That is not an average. The highest in any week of seven days was 1,110,000; another week it was 1,051,000, and in another 1,047,800; they were in the depth of winter. In Golcar there are 1536 houses, of which 200 are supplied with gas. Longwood has 900 houses, and 300 supplied. Linthwaite (in that part included in the district) 900 houses, and 280 supplied. That is exclusive of what Slaithwaite may supply; they supply about 158 houses. In Quarmby there are 205 houses, and 115 supplied. Making a total within the proposed limits of 3541 houses, and 895 supplied. That does not include mills. The consumption of gas has gone on rapidly increasing since my appointment in 1873. It is absolutely necessary, I conceive, to obtain further land, and make arrangements for producing more gas. We cannot do what is necessary upon the land at present possessed by the company. I am aware that 6s. is the maximum price asked for in the bill. At this moment we are charging 4s. 6d. The maximum should, in my opinion, be 6s., because the district is a very scattered one, and it takes a long length of mains to supply the requirep amount of gas. There is also a very great disparity between the amount of gas required in the summer and the amount required in winter. The price of materials is rising. All that is independent of strikes. The average of the prices charged by 22 companies in the district is a little over 5s. 10d. per 1000. I have never heard of any complaints, except last year, when Messrs. Armitage's works were being added to our own. I did not then receive half a dozen. I did have one from Dyson Brothers last November. I do not remember a complaint since then. I do not remember any complaints between the time of my appointment and the taking over of Messrs. Armitage's concern. I was present at the interview with the Slaithwaite Gas Company. I was in the room when Mr. Armitage gave his evidence. I have been with our manager to Golcar and Linthwaite to ascertain the number of houses there which are supplied by the Slaithwaite Gas Company. We found that, out of 114 houses in Golcar, they supplied 49 and 7 mills. Mr. Hanson has never made any complaints to me as to the quality of his gas. I am not aware that he has even asked for additional pressure since I have been secretary. I was in Messrs. Dawson's office on one occasion when Mr. Hanson came in. He was talking to Messrs. Dawson, and he said, "We will have a new gas company, and it shall be called the 'Mutual,' and their works shall be erected on the land opposite our works." I understood him to mean on the land coloured yellow, the plot on which we propose to erect our new works.

Cross-examined by Mr. PEMBER: I did not hear Mr. Hanson say anything more than that. The entrance to Messrs. Hanson's works is opposite the land coloured yellow, the land proposed to be occupied by the company. I consider the bill important for the neighbourhood. We have not solicited requisitions. When I was in Messrs. Dawson's office, the Messrs. Dawson were present and Mr. Hanson. There are 75 shareholders in our company. I do not know our producing power per hour. The highest we have produced for a week is 1,110,000. I do not know how many retorts were used. We have three holders in use. I do not know the capacity of the fourth, which is not used. I remember a deputation of consumers waiting on the board. I believe they discussed matters with us. I believe they complained of the price of the gas. I believe also that discounts, and things of that sort, were talked of. I do not remember as to an agreement for three years. We decided to reduce the price to 4s. 6d. Mr. Hanson has never in my hearing complained of the supply of gas. There are 400 houses in Golcar not supplied with gas, beside a church, two schools, and a meeting-house. I believe the Slaithwaite Company supply every mill in Golcar. The church not supplied was built two years ago. We have not had any requisition from any public body in that part, asking us to supply gas there. We have not had any from Upper Linthwaite. Our board has not made any request to the Local Board of Linthwaite to lay pipes beyond where we now are. I am not aware that the Local Board of Linthwaite opposed this bill upon Standing Orders. I was not aware that most of the millowners in Linthwaite were opposing this bill on Standing Orders. We have had complaints from one millowner there. There may be 15 mills at Milnsbridge. Messrs. Dyson were the people who complained. I cannot say that Mr. Sykes did. There may have been half a dozen altogether who have complained a little, but I do not remember who they are. One only was by letter, the others verbally. I do not know that they were the largest millowners; they might have been ladies.

By the CHAIRMAN: There have been a few complaints from cottagers when I have been going round.

By Mr. LEDGARD: I do not know anything about the constitution of the new gas company, the Colne Valley Company. I know Messrs. G. Dyson and Son, Mr. E. T. Sykes, Mr. E. G. Dyson, Messrs. John Shaw Brothers, Mr. Samuel Brook, Mr. Richard Eaton, and Mr. Titus Calverley. They are some of the largest millowners at Milnsbridge. I have heard that they have joined the Colne Valley Company. It is reported that they are getting up this company, and do not wish to have our gas any more. I am not aware of any extension of our mains in Golcar since I have been connected with the company. I have access to all the reports and accounts of the company. I cannot tell when the last outlay was made for extending our mains in Golcar. I do not know of any company between us and the Slaithwaite Gas Company. I do not know the maximum power of supply of the Slaithwaite Gas Company. I do not know whether they are able to meet any increased demand that might be made upon them. I do not know anything of their works in Golcar.

Re-examined by Mr. ATKINSON: The complaints referred to were made as I was passing through the district; therefore I have no recollection. We could not build on our own land a gasometer large enough for our present demands. It is desirable to remove one of our present gasometers out of the way to make room for storeage. Since we have charged 4s. 6d. there has been no complaint as to charge.

Mr. *Jonathan Garside*, examined by Mr. ATKINSON.

I am the gas manager of the Longwood Gas Company. I was first appointed in 1861. When I commenced my duties we had 10 retorts. We had a gasholder 50 feet 6 inches diameter, and 20 feet deep, capable of holding 35,000 cubic feet. We have now 72 retorts. We have an additional gasholder capable of holding 70,000 feet. We also use a third holder, which was on Messrs. Armitage's place, and which will contain 20,000 feet. That is all the company have now in use. In 1861 we had four miles of mains; we have now 9½ miles. There are 409 pipes fixed in the mains. I know the district well. I have known it 14 years. Our present works are not sufficient to meet our present demands for gas. The holders are insufficient. We could supply better and purer gas if we had better accommodation. I have been round the neighbourhood for the purpose of ascertaining whether or not there is any land beside Mr. Hanson's suitable for the purposes of the company. The piece of land on the other side of the railway would be out of sight from our works. It would not be possible to use it except at a great cost. The maximum charge of 6s. is quite little enough, because there is such a great variation in the consumption. I went round to the various works to ascertain the prices charged. While we were altering the mains of Messrs. Armitage there were a few complaints. Since then I have had none. Mr. Hanson has never made any objection to the quality of the gas. He has several times spoken about the pressure. In consequence of that the pressure was increased. We examined his own service-pipes, and found them choked.

Cross-examined by Mr. POPE: Our existing works are insufficient to supply the demands for gas in our present district. We want to increase our consumption. The district we are in is increasing. The blue lines on the map represent the extent of our mains in Golcar. I am acquainted with the country. I cannot tell as to the supply needed in cottages.

By Mr. PEMBER: I am a shareholder in the company. I have about 40 shares not all paid up. I do not know the size of our disused gasholder. It would perhaps hold 15,000 feet. We keep 58 retorts in use out of the 72. Sometimes we only have 7 in use. The highest number is 58 in the winter. We might double some of our retort-beds. Our average hours of consumption per day is about nine hours. We begin with our gasholders full at three o'clock. I have seen 40,000 feet per hour go out between three and six p.m. Then the consumption begins to drop off. Mr. Hanson has complained of want of gas, but not of quality. Once, some time ago, he told me that his hands refused to stay in his works because of a bad smell of gas. He has never told me that he had 10 per cent. of his female hands made ill by the bad gas. Mr. Hanson's pipes were clogged once. It was caused by the oxide of iron in the main, it being a wrought-iron one, and it got choked at the bottom; the gas had nothing to do with it. A main from our works to the land on the south side of the proposed land would cost about £200. If our retorts were not at sufficient heat there would be more tar in the gas, and that would cause clogging; we must take that out by condensing and purifying. As to the north plot of land, I have no reason at all to suppose that Sir Joseph Radcliffe would not let us have it. I do not think he would be hostile. Messrs. Hanson are very much against our having their land. I know the difference there is in price between a compulsory and a voluntary sale. I do not know that our putting a gasholder on the land at the north is a mere question of money. It is the same class of land as that is where our gasometers are now. When we erected our present gasometer we had a landslip, and it caused us immense expense. The land at Shire's Mill is not the sort of land we require, you could not get a good foundation. I do not know that the new gas company were willing to take that site of Messrs. Armitage.

Re-examined by Mr. ATKINSON: If our gasholders were high up we should have to force the gas down, which would be objectionable. Apart from the question of holders, we have sufficient producing power to supply the whole of our district. To meet the increased demand in the district which we have had the last ten years, we require double our present holder accommodation. At present, we are obliged to pass the gas off from the holders sooner than it should be passed.

By the REFEREE: It is two miles from the discharge point at our works to the end of our longest main. We have 9½ miles of mains. The price of coal last year was 21s. 2d. a ton; it is 19s. now. We have paid as much as 25s.

By the COMMITTEE: We make 9000 cubic feet of gas from a ton of coal. The coal comes from a place near Wakefield, 17 miles off.

Mr. *W. Haigh Dyson*, examined by Mr. ATKINSON.

I live in the borough of Huddersfield, and have lived there all my life. I was surveyor of the highways in 1858-9. I am a shareholder in the Longwood Gas Company. I have been a director, and was appointed chairman in 1868, and am in that position now. I am acquainted with the works of the company, the extent of its operations, and the necessities of the neighbourhood. It is very desirable that the company should have parliamentary powers. I have been over the district to find a suitable site for our proposed works; and find that the piece of land proposed to be occupied is the most eligible. I have noticed the other pieces which have been named. They are very unsuitable for our purpose; especially the piece to the north. I think we ought to have a maximum charge of 6s. on account of the variation in the price of coal, and

the peculiar character of the district—it is a suburban district, and very difficult to supply.

Cross-examined by Mr. PEMBER: I was not present at the first meeting of the Slaithwaite Gas Company with our board. I was present at the second. We did consider their proposition, but we thought that what they wanted had better be done at a further stage of the bill. We did walk round and see the limits proposed by the Slaithwaite Company. That was before the meeting of Dec. 31, 1874. At that time the bill was being opposed on Standing Orders. The opposition was by Messrs. Hirst and Co. I do not think the proposition was one to be acceded to. I am not aware of complaints having been made as to our gas by millowners in Linthwaite. I was present at a meeting on Feb. 4, 1874, when it was resolved that four gentlemen should be empowered to oppose the bill if they thought fit to do so. Some did complain at that meeting as to the quality and supply of gas. The chairman did ask me to address the meeting, which I declined to do, for a very good reason. I do not know anything about the Colne Valley Company. I am not aware of any requisition from the portion of Golcar near Slaithwaite or Linthwaite asking us to supply them with gas. I know that two gentlemen named Taylor and Walker are supplying that part of Golcar which the Slaithwaite Gas Company wish to include in their district.

By the REFEREE: The area of our present works is 1¼ acre; the proposed land is about 3½ acres.

Mr. *Law Heppenstall*, examined by Mr. SOMERSET.

I live in Golcar, and carry on a considerable business as a woollen cloth manufacturer. I am a director of the Longwood Gas Company. I have resided in Golcar 40 years. I have been a member of the Local Board of Golcar since its existence, within one year. I am now chairman of that local board. I am one of the original shareholders of the Longwood Gas Company. I know the district well. Golcar does require more gas: the demand has been increasing for eight or ten years. It is the same with the other districts. It is certain to continue to increase. We cannot properly supply the district unless we have more capital and parliamentary powers. That is why we come for this bill. I agree with all that has been said as to the increase in houses, mills, and population. As to our new works, we have searched everywhere for a suitable site, and cannot find a better than the one proposed. I think 6s. a fair maximum price. The average price charged by other companies is 5s. 10d.

Cross-examined by Mr. LEDGARD: My mill is at Garthwood Mills. I live a little above. I am supplied by the Longwood Gas Company. I do not recollect when our mains were extended in Golcar in the direction of Slaithwaite. There has been a great demand in Golcar. The whole of Golcar demands it. We have an order from the Local Government Board in London to supply the neighbourhood of Golcar with gas—that is, the streets and frequented places. There has been an increase in the number of mills and manufactories in that part of Golcar between Heath House Brook and Slaithwaite within the last few years. I believe all the mills in that part are supplied with gas by the Slaithwaite Company. The railway station of the London and North-Western Railway is supplied by the Slaithwaite Company to a certain extent. We supply it partly, I believe. We do not supply the streets in that part. Our customers have complained at different times.

By Mr. SOMERSET: I am chairman of the Golcar Local Board, and the inhabitants complained to me that their streets were not lighted. The Local Government Board of London sent down a commissioner to inquire into the matter. The commissioner reported that the streets ought to be lighted, and we have had an order from the Government Board in London telling us to have the streets lighted as soon as possible. That order extends to the whole district of Golcar.

Mr. *William Hall Hattersley*, examined by Mr. SOMERSET.

I live near Quarmby, and carry on business as a woollen cloth manufacturer. I am a director of the Longwood Gas Company. I agree with what has been said with regard to the absolute requirements of the district for gas, the increased consumption, the increased population, and so on.

Cross-examined by Mr. LEDGARD: I have frequently been through the township of Golcar. I do not know how many mills there are in Golcar. I am a millowner. My mill is close to Longwood. I cannot say how many mills in Golcar the Longwood Company supply. I only became a director in September last. I know very little about the township of Linthwaite and its requirements.

THURSDAY, APRIL 15.

Mr. *William Haigh Dyson* recalled, and cross-examined by Mr. GATES.

The proposed land is the most suitable for the purpose. I know that Messrs. Hirst, Hanson, and Co. are in the occupation of that land. Until we had deposited our plans we did not tell them that we proposed to take the land. I could not say that when Mr. Hanson saw our notices he directly came to see me. We met regularly every week. I do not remember that the first time we met he spoke to me as to the taking of his land. He has complained of our audacity in proposing to take the land. I could not mention the time. I do not know whether it is usual for a gas company to have compulsory powers to take land. He did suggest the land to the north as suitable for us. I do not think he spoke of our having space on our own premises, or on the works at Messrs. Armitage's. I do not remember Mr. Hanson saying we could have the land on the south side of the railway. He might have said a number of gentlemen had a lease of that piece, and we could have an acre. I do not remember anything more. He did say the Colne Valley Gas Company had acquired the land, and did not want it all, and we might have some of it—perhaps an acre. That piece would not be eligible for us. I do not know the value of Mr. Hanson's works—they are considerable.

Mr. *Samuel Kenworthy*, the secretary, was recalled to prove certain letters of March and April, 1874, which were sent to him by several consumers, and which resulted in the Longwood Gas Company reducing the price of their gas from 5s. 6d. to 4s. 6d.

Mr. *C. F. Mallinson*, examined by Mr. SOMERSET.

I am an engineer and land surveyor, residing at Huddersfield. I have had considerable experience for many years in such matters. I have been the surveyor of the Longwood Gas Company for many years. I am also surveyor to Sir Joseph Radcliffe. The site of our present works is leased from him for 999 years. The piece of land to the north is Sir Joseph's. It is not fit for gas-works; it is too steep, the gradient is 1 in 3 and 1 in 4. Building has been going on in the district for many years, and is increasing very rapidly indeed. Within all the limits there are 45 mills, and the population numbers about 15,000. In 1874 the annual value in Longwood was £13,244 18s. 10d.; the rateable value £10,451 10s. In the portion of Lindley-cum-Quarmby coloured blue on the map, annual value, £3547; rateable value, £2672. In Golcar, annual value, £22,218; rateable value, £17,254. In Linthwaite, annual value, £14,912; rateable value, £11,976. Total annual value, £53,923; rateable value, £42,355. I know the district and the portions which are lighted, and by whom. I produce a plan and a model of the Longwood works, and a plan of the mains. Our mains extend 9 miles 6 furlongs and 145 yards. It is my opinion that further capital and power should be obtained for an increase in the supply of our gas. The consumption is greatly increasing. I have been over the district examining it for a suitable site for the new works. I find that the land proposed is the most suitable for an extension of our storeage room. It is the only site I can recommend. I do not think the whole of the plot is required; part of it might meet our present requirements, and give us a reasonable time in the future. The size of the plot is 30 acres 1 rood 33 perches, and half that amount would do for us. I know the position of Mr. Hanson's house. The works we should erect would not be visible from his house in any way. We shall place them on the north-east part.

Cross-examined by Mr. GATES: I am a land surveyor by profession. I cannot say that I have had to do with selecting sites for gas-works before, but I assisted in setting out our present site. Messrs. Hirst and Hanson's mills are the largest and most important in that district. I will not say that they are more important than our little gas-works; our works are of importance to the whole district. There is room enough elsewhere for Messrs. Hanson. I do not know where a small gas company have got compulsory powers for the extension of their works. I have not read Messrs. Hanson's petition against our bill. I am not aware that the Corporation of Huddersfield goes beyond its own borough in order to supply gas. We stop within 100 yards of the Angel Inn with our pipes.

By Mr. DUGDALE: I know the portion of Mr. Savile's estate lying to the west of the land we propose to take, and north of the London and North-Western Railway. It is a property some part of which is very suitable for building villas. It is high land, and rises above the London and North-Western Railway. There is a villa there now, and occupied by Mr. John Shaw. I know that Mr. Savile has made roads for the accommodation of the land. I believe that the land we propose to take has been let to Messrs. Hanson for the purpose of building a manufactory.

By Mr. LEDGARD: I prepared the plan which shows our mains. They do not extend into Upper Linthwaite. There have not been so many buildings erected between Heath Hill Brook, Slaithwaite, and Golcar, as in some other places.

Re-examined by Mr. SOMERSET: Mr. Shaw has a villa near that new land. He told me that gas-works on that land would be no nuisance to him. The land between the proposed site and Mr. Shaw's villa belongs to Mr. Savile, but is all taken for mill purposes.

Mr. *John Newton*, examined by Mr. ATKINSON.

I am a civil engineer, and a member of the Institute of Civil Engineers. I am in partnership with Mr. Cawley, and have offices in Manchester and London. I have had great experience in gas-works. I have examined carefully the works at Longwood; also the books, as to their consumption. There is an increasing demand for gas in the district. It is absolutely necessary for the company to have increased accommodation for manufacture and storeage even for next year. The proposed site is the most suitable for their new works; all the other sites are very unsuitable. In six years they will require works double the size of their present works. At present another holder is absolutely necessary. It is usual to take compulsory powers in this way in the country.

Cross-examined by Mr. GATES: The proposed site is not suitable for the cottages of labouring men, or cottages of any character.

Mr. *Cawley*, M.P., examined by Mr. ATKINSON.

I am by profession a civil engineer, and both as engineer and in matters of legislation have had much to do with gas-works. I know the Longwood Gas Company. Last year when they agreed to purchase Messrs. Armitage's works I was appointed arbitrator in the matter of the purchase; that led me to have an intimate knowledge of the works, and they consulted me as to coming to Parliament, and what course they should take. I thought they ought to come for a separate Act. I am perfectly familiar with the neighbourhood. There has been an enormous increase in the number of mills, population, and so on. It is essential that they should be supplied with gas, and that the companies supplying should be under restrictions and limitations. I went through all the figures, and it is essential for the proper working of the company that they should have more land. The company still use the holders on Messrs. Armitage's land, or they could not carry on their business at all. That land they cannot purchase. The proposed site is certainly the most suitable one for an extension of their works. I should recommend placing the holders on the new land, and using the old for manufacturing purposes. I know Mr. Hanson's house. It would not be injured at all by the proposed works. I have seen the other plots of land proposed, and they are all very unsuitable for gas-works. I do not know that I can recollect a company, coming for the first time to Parliament, having compulsory powers granted, but companies requiring additional land do come for compulsory powers.

Cross-examined by Mr. PEMBER: It is the usual thing for gas companies to take land compulsorily. The portion of Mr. Hanson's land which is required is the least useful portion I should consider. He could still purify his water after taking the portion proposed. I have never advised the company to schedule any other land except the piece proposed. It is the most suitable piece in the district for the proposed works.

By the COMMITTEE: The life of a good gasholder is 15 to 20 years. The distance from Armitage's works to our gas-works is half a mile.

Mr. SOMERSET said that was the case for the promoters of the bill.

Mr. PEMBER said that Messrs. Hirst, Hanson, and Co., whom he represented, were the proprietors of large manufacturing works of the value of £50,000, besides which they had a floating capital of another £50,000. They had obtained the piece of land which the Longwood Gas Company desired to have, and it was vital to the existence and continuance of their business. They wanted it not only for the extension of their works, but for the purification of the residuum of the effluent water from their manufactory, which, sooner or later, they would be forbidden to cast into the river. They most required the lowest portion of the land, the very portion most desired by the Longwood Gas Company; therefore the committee must not think that it was from any immalleability on Messrs. Hanson's part that they insisted on having it. The residential question was by no means the most important one. The purchase of that particular piece of land was the outcome of long deliberation on the part of Messrs. Hanson as to how far and in what direction they should extend their works. If they were not to carry out their extension on that piece of land, they would ultimately lose nearly £35,000. So that the case stood thus: A trading concern, with a capital of £24,000, was compared with another representing £100,000; and Messrs. Hanson's works were quite as beneficial to the general community as those trumpery gas-works. When it was said to the gas company, "Why not get some other piece of land?" the answer was, according to one witness, that they could work with "more comfort" on that particular piece. That was no reason why it should be given up to them, especially when the fact was undisputed that other pieces of land could be had at a slightly additional cost. As to the statement of the company that it was necessary to increase their power of manufacture and storeage, there was no need for it, for the district did not want their gas. A supply could be got from other companies. If, however, to increase their power of manufacture was absolutely necessary, they could so alter their retorts as to increase the amount of gas made in one day from 220,000 to 300,000. Then, as to an increase in their storeage capacity, that could be obtained by telescoping their gasholders, a thing that was frequently done by gas companies. If an additional holder was needed, one could be placed (as was shown by their own model) on the land which was already part of their works. If compulsory powers were given to the company to purchase this land, they would find they had got a white elephant, for they would certainly have to pay for it through a jury; they might, therefore, just as well lay out a little more money in acquiring another site. Whatever was done with regard to the bill in other respects, it was to be hoped that the committee would protect the right of the present owner of that particular piece of land, and not grant a power to the company which would be prejudicial to his interests to such an extraordinary degree. The neighbour-

hood was well supplied already. The consumers did not like the company. Other companies were already there, and another had just been started by some of the chief consumers; he, therefore, submitted that the finding of the committee should be that the preamble of the bill was not proved.

The room was cleared for a short time, and, on the readmission of the parties, the petitioners case was proceeded with.

Mr. *Benjamin Hanson*, examined by Mr. GATES.

I am a partner with Mr. Hirst and my two sons in the firm of Hirst, Hanson, and Sons. I am a member of the Town Council of Huddersfield. Mr. Hirst is a director of the London and North-Western Company. In 1863 we purchased our present mills, called Cliffe End Mills. They are partly freehold and partly leasehold. The works have greatly increased. Their value is now £100,000. We turn out 3000 yards of cloth a day, employ 400 hands, and pay £400 a week for wages. We consume 3000 tons of coal a year, and 500 tons of raw material. In 1867 our business had so increased that we had to get additional land of Sir Joseph Radcliffe. We also took some land of Mr. Savile, at a lease of 999 years, for the purpose of extending our works and for purifying our water. We have to spend £1900 by next June in building, and plans were got out in March, 1874, which were approved of by Mr. Savile's agent and the agent of the local board. When our late partner, Mr. Greenwood, retired from the firm, another agreement was made with Mr. Savile. We have a large warehouse in Huddersfield, and have had to increase it lately. The land we at present occupy is completely covered with our works. We use our present machinery 14 hours a day, and put as much duty upon it as it can possibly discharge. We have had two break-downs in consequence. That has inconvenienced our customers so that an increase in our premises is of vital necessity. The proposed site was bought by us for that particular purpose. There is a brook runs through it which is not only necessary for our present works, but will be for our new ones. Our weir on the brook is proposed to be taken by the company. To have the land taken from us would be serious, for we gave ¾d. a yard for it, and should have to give 3d. a yard for a site elsewhere. There is water upon it, but, if we took a site at Milnsbridge, we must pay 5s. per horse power for water. We should have to pay extra for cartage of goods, and also for increased superintendence. To go to another site would involve us in an additional expense of £1123 altogether. Our new land is lower than our old, and that makes it more useful to us for the purification of water. The cottages which are upon it are wanted for our workpeople. When the parliamentary notices were out, I saw the chairman of the Longwood Gas Company, and discussed with him the question of sites. I called his attention to the north site, along which the gas company has a main running already for the supply of Lindley-cum-Quarmby. That land belongs to Sir Joseph Radcliffe. I told him that they could telescope their present holders, and put another holder, if necessary, on their present site. I told him that they could have part of the land on the south—that is, 5½ acres. I told him they could have that piece, I knew. It was shortly afterwards taken by the New Gas Association. I saw Mr. Dyson, and told him of it, and said that the Longwood Company could still have a portion of it if they wished. In March, 1874, I took part in a deputation to the Longwood Gas Company as to price. I had myself privately made complaints beforehand. In February, 1874, we had accounts furnished to us, charging £50 or £60 more than was proper. I sought an interview with the company. I had first of all to pay it, and then, six months afterwards, the matter was referred to one of their directors. He admitted the error, and we were repaid the overcharge with interest. It was at that time another company was started, but ultimately the Longwood Company acceded to the wishes of the deputation. They reduced the price of their gas from 5s. 6d. to 4s. 6d. The price charged by the Huddersfield Company is 4s.

FRIDAY, APRIL 16.

Mr. *Benjamin Hanson* recalled, and further examined by Mr. GATES.

I made complaints as to the quality of the gas as well as with regard to price. We have been customers of the Longwood Company 12 years, and during that time we have complained scores of times of the impurity of the gas. We have had our large room filled with sulphur, so that you could not bear it; it was not fit for any human being to live in at times. I have complained to the manager, Mr. Garside; to Mr. Shaw, the late secretary; to the certifying surgeon, the late Mr. Roberts; and I have gone to Paddock, to the chairman's house, and complained.

By the CHAIRMAN: I never complained in writing.

Examination continued: They promised to improve the quality, and, for a month, it was better, and then it fell into the bad state again. This is the first year we have not had to complain of the gas—that is, since this bill was deposited. Our workpeople have greatly suffered from the bad gas. We have a room where there are girl weavers; it is a vital part of our business, and I have taken very close notice of the attendance of the girls, and the per centage of girls absent has been very great because of the bad gas. In 1866 I took some land from the Radcliffe estate for the purpose of adding to my private residence. I have bought some more since then. I built the residence myself, when labour and material were 30 per cent. lower than they are now, and it cost me upwards of £70,000. It is now worth £10,000. We can see the Longwood Gas-Works from my residence. If their new works were placed on the south side of the railway, they would be hidden by the viaduct. It is of vital importance that we should have our works on that land; our business has so increased that we must now extend. We opposed the bill on Standing Orders at great expense, and it was upon that opposition that the 4th clause was struck out. We have been paying £63 a year ground-rent since 1866. If we lose our land we shall lose altogether £34,000.

By the CHAIRMAN: We have often thought of erecting gas-works on our own works on account of the inconvenience we have suffered from the bad supply.

Examination continued: This photograph shows the approach to my mills. What I said to Mr. Dawson about putting up gas-works near my premises was this—I spoke of starting the Mutual to Messrs. Dawson, when Mr. Kenworthy came in, and I said before I would submit to the injustice of the Longwood Gas Company I would have works of my own opposite my own works. The place I meant was near the gate, where the materials we use go in. The ground opposite is leased to us.

Cross-examined by Mr. LITTLER: Our mill is six storeys high. The new Longwood works would not be seen from my house if placed on the eastern portion of the proposed land. If I had my works there, I could get a road made from the old works. Such things are done in the district. I cannot speak as to the levels of the two pieces of ground. We did oppose the bill before the examiner, and get something struck out of the bill. That did benefit me individually. We want to retain our rights, and on that ground it has benefited me; the promoters are doing an injustice. It has done us good because we have to a certain extent crippled the company. I propose to build a mill about 2½ acres on the new land. We have had the plot since 1867, and have not built upon it because we waited till we had fully occupied the old site. My great objection to the bill is that they want my land; but I should like their gas to be purer. I do not know that the Act under which the Longwood Gas Company seek to place themselves would cause them to give purer gas, and would enable them to be punished if they did not. It is an advantage to the consumer that the gas company should give 14-candle gas, but it is often not carried out. I object to the maximum price. Parliamentary companies have put down sinking-funds in our neighbourhood. I know that the Millowners Association assented to a charge of 6d. per 1000 more than Huddersfield was charging. Mr. Lipscombe was agent in 1867 for the Savile estate. I did not say that I intended to build a mill on it, but nobody else should. I do not know that in my agreement with Mr. Savile I was bound to commence building within two years. Whatever the time was, we let it run out, but it was with his consent. It was not till 1874 that we began to build. I had not then the slightest idea of the gas-works being extended.

By the CHAIRMAN: The distance between the cottages on our new land and the river is 150 yards. Our nominal horse power is 45. The new land is 10 feet lower than the old, and is absolutely necessary for our business. It has water upon it that would be most useful to us. We propose to have a communication between the works by tunnel under the road.

Mr. *George Crowther*, examined by Mr. GATES.

I am an engineer and surveyor, and have been associated with Mr. Hawksley as to the water-works at Huddersfield. I know the district. I know the present state of the gas-works. The land on the south side of the London and North-Western Railway I consider the best for the extension of the gas-works. There is quite sufficient land within the curtilage of their own land for extension. There is a space at the north-west corner of their own land for another gasholder. I know the whole valley well. It is well to have gas-works situated on as low ground as you can There is a site suitable on the north side of the road leading to Messrs. Hanson's mills. There is another site on the south side of the railway shortly above the station. That would be as accessible by rail and water communication as their present works. They could get from one set of works to the other by an archway. The gas company could manufacture all they want by enlarging the beds and the retorts.

By Mr. DUGDALE: I am acquainted with the land to the west of the proposed site. It is very suitable for villa residences. I know that it is Mr. Savile's intention to let it as opportunity occurs for villa residences. The proposed new gas-works would injuriously affect the letting of that land.

By the CHAIRMAN: I know the land personally.

Cross-examined by Mr. LITTLER: I have not constructed any gas-works. There is already a villa on Mr. Savile's land. I seriously say that Mr. Savile's land is suitable for villas.

By the COMMITTEE: The promoters present works are not visible from this land. There are 30 or 40 acres of the land; roads and streets have been specially constructed to develop the property. It is a nice piece of land of 1 in 20, and gradually slopes westward; the buildings will stand very pleasantly.

Mr. *Abbey*, examined by Mr. GATES.

I am the surveyor of the borough of Huddersfield. I know the old works of the Longwood Gas Company, and the new works they have acquired, called Armitage's works. I know the levels. Armitage's works at Milnsbridge are 279 feet above road datum. The old works are 341 feet, or 62 feet higher. The lower portion of the proposed site is 327 feet, or 14 feet lower than the present Longwood works, and 48 feet higher than Armitage's: the higher portion is 345 feet, where the cottages are, making a difference of 18 feet between the lower portion and the upper. I know the land to the north of the old works. It could be made available for gas-works. I know the old works as shown by the model, and a new gasholder could be placed very well on the portion of ground which is vacant. I know that the bill does not take a portion of Royd's Hall within its limits. That causes a portion in the shape of an isosceles triangle to be left unsupplied with gas. I know the works at Armitage's. They are convenient for gas-works. There are a number of sites in the neighbourhood, all of which I imagine would be good for gas-works. There are 15 or 20 acres to the east of the blue line belonging to Mr. George Radcliffe; it is in the market. The level of it ranges from 300 to 310—a gentle inclination to the south-east. I am agent for all these sites except Armitage's. I know the new land of the petitioners. It is very eligible for the extension of their works, and the bottom part of it would be peculiarly adapted to their purifying purposes.

Cross-examined by Mr. LITTLER: I do not profess to be skilled in gas-works. I prepared the plan where the new works were to be put by Messrs. Hanson.

Mr. *Burgess*, examined by Mr. GATES.

I am the manager for the Huddersfield Corporation Gas-Works. I have lived in the district 20 years. I know the gas-works of the promoters; their old ones and the new ones at Milnsbridge. There is room on their old works to put an additional gasholder. By telescoping they could double the space at their command for storeage. A new holder could be put up at Armitage's works.

Cross-examined by Mr. LITTLER: I would recommend a new holder to be placed on land which is only leased. I would recommend one on their own ground. I have not examined the ground. The land to the north is a little higher than the present works. I have not constructed any gas-works from beginning to end. I have put up a holder to contain 560,000 cubic feet. I was the engineer. I have been a gas engineer for 20 years.

By the COMMITTEE: I do not think telescoping dangerous. The distance between the gasholder on the Longwood works and Mr. Hanson's works is 125 feet, giving enough room for a 90-feet gasholder. A holder could be placed there without danger.

Mr. *Wm. C. Holmes*, examined by Mr. GATES.

I am a gas engineer and manufacturer of gas apparatus. I have been engineer or contractor for 400 or 500 gas-works in England and abroad. There is room on their present ground for another gasholder. I agree as to telescoping; it can be done without danger, because, if the wind be high, it is a mere question of calculation as to how much stronger the columns shall be made. I know the works at Armitage's, Milnsbridge. I do not see any objection either to putting a new holder there or using the disused one. In that way the Longwood Gas Company could get an abundance of storeage room.

Cross-examined by Mr. LITTLER: I would not recommend the spending of money at Armitage's. I have never given evidence here before. I have generally recommended people to Mr. Hawksley. It is important that works should be close together. You have a saving in expense by telescoping.

Re-examined by Mr. WELLS: You can double the size of a gasholder by telescoping it.

Mr. *C. Hirst*, examined by Mr. GATES.

I am a large manufacturer at Longwood. I know Messrs. Hirst, Hanson, and Co.'s works. More than a year ago I had a conversation with Mr. Hanson about extending his works on the proposed site. It is the only available land on which to extend his works. The lower portion is particularly convenient for him.

Cross-examined by Mr. LITTLER: Purification is not a very nice process to carry on. We find the fouling of streams more and more objected to in Yorkshire. I have had some experience of that myself. I have no fault to find with the quality of the gas supplied by the company.

Mr. *T. Hawksley*, examined by Mr. GATES.

I have had more than 40 years experience as an engineer. I am engineer for the Huddersfield Water-Works. I know the neighbourhood at Longwood. I was called in by Mr. Hanson to look over the property with a view to giving evidence here. I should say that the land proposed to be taken from Mr. Hanson was exceedingly valuable for his purposes. I was very much struck with it for two reasons—first, the land is exceedingly advantageous for the purposes of extension, and next for the purpose of purifying the foul water—the dye water—if the Legislature should make it incumbent upon millowners to prevent foul water running into the rivers. At present the Longwood Brook turns out water black as ink, and Mr. Hanson is

reasonably under the impression that the Legislature are going to make it incumbent upon millowners to clarify the water they foul before it enters the rivers. The land is below the levels of Mr. Hanson's present works, and is exceedingly eligible for the purpose of purification. But it is of greater importance to him as a site for the extension of his manufacturing premises, for he has nothing to do but to extend his mill upon the land in question, and then making what is very common, a bridge on the second storey above the street, to form a communication with it. On the other hand, this land further on is very well situated for any extension of the gas company's premises, without injury to Mr. Hanson. There are also other lands eligible. This north site is perfectly available; the lower portion is not so much inclined as the upper portion; but inclination is of very little consequence when you can put your gasholders on the land. I did not go to the works of the gas company. There is room, according to the model, for another gasholder which would hold 100,000 feet. I do not object to telescoping. Gasholders of the same character as those used here are telescoped, although standing on the sea coast, where they are exposed to the heaviest gales that can possibly blow.

Cross-examined by Mr. LITTLER: I was first consulted about this matter two or three months ago. I did not know anything about permission having been asked and obtained for me to see the Longwood works. I do not care to have all my works as close together as I can; that is not always important. The land belonging to Mr. Hanson falls towards the brook. I have had no particulars of the extent of the works that Mr. Hanson proposes to put up on his new land. The system of purification will cause a large space of ground to be wanted if Dr. Frankland's nine tests are to be made applicable, and those are proposed by the Government. I cannot say that the land to the south would be suitable for purifying purposes. We are always exposed to winds in erecting gasholders, but I have never made any difference in those I have erected; winds blow so variously that practically all require to be made equally strong. If we are going to telescope a gasholder we have to strengthen it. I prefer expending a little more money in those I erect to have a solid and good concern.

Re-examined by Mr. GATES: There is no reason why that should not be done here.

By the CHAIRMAN: The piece of land on the south of the model shows a portion of Mr. Hanson's land. If that were taken off from the land called "new land," it would be very detrimental, for, as you will see, if there were to be an extension of the mill, anything put upon this land that was of considerable height would be injurious to the light of the mill. These mills have windows, and it is necessary to get as much light as possible.

By the COMMITTEE: There are sheds which get light from the roof; but these mills are sometimes five or six storeys high. It is exceedingly rare for a company to have compulsory powers in these gas bills. I have not known of any case where they have had those powers, excepting when the land required has been in immediate contiguity, not even separated by a road. There are a few old cases of that kind, but of late the Legislature has been very much opposed to giving compulsory powers in the case of gas-works. It is very unusual for them to be given.

Mr. DUGDALE said that he appeared for Mr. Savile, who was the equitable tenant for life of the estate surrounded with blue on the smaller plan. Four years ago Mr. Savile had let the land known as the "proposed site" to Messrs. Hirst, Hanson, and Sons, and they entered into stringent covenants, such as are usually observed. West of that piece of land was another piece of about 20 acres, suitable for villas. The idea was, that when Messrs. Hanson had erected their mills, they would be a protection to the estate from any nuisance that might be caused on the works of the Longwood Gas Company; therefore, Mr. Savill could not see without concern the proposal made to take his land. He was apprehensive that there would be a serious impediment caused to the letting of the land for building, if the committee allowed the promoters to take it. The land to the south of the proposed site could be let to the gas company if they wished it. Mr. Savile entirely objected to his land being taken by those promoters compulsorily without his consent. He thought that he was entitled to ask the committee that, unless they thought there was some very urgent public necessity for giving it to the promoters, it should be left in its present state; and hoped that the committee would not allow them to take it for a supply of gas to the new district, when they might enlarge their own works or put new works on other land. The objects of the company would be perfectly well met by clause 51 of their bill, which provided that they should have power to purchase by agreement three acres of land. The committee had heard from Mr. Hawksley that compulsory powers were very rare, and clause 51 gave the company power to purchase such land as they needed. If the public interest required it, he must give way; but he trusted that, under the circumstances of the case, the committee would not suffer that piece of land to be taken from Mr. Savile's lessees, and the reversion of it from Mr. Savile, unless the public interest required it.

Mr. LEDGARD said he appeared on behalf of the petitioners—the Slaithwaite Gaslight Company, Limited, and the freeholders, leaseholders, and other inhabitants of the townships of Golcar and Linthwaite. First, as to the Slaithwaite Gas Company, when he had laid his evidence before the committee, it would be seen that the Slaithwaite Company had been put to needless expense by the promoters. The Slaithwaite Company had supplied the district to its entire satisfaction. They had invested a large capital, which had only just become remunerative to them; and, if they had no statutory powers, that was the fault of the promoters of this bill. If the Longwood Company had a right to go to Parliament for statutory powers, the Slaithwaite Company had a far better right to do so. The Longwood Company came to Parliament, first for their own protection, and, secondly, for the interests of the public. It was, therefore, for them to show that the district needed the supply. He had before him the petition of the freeholders, &c., of Golcar and Linthwaite, including the Local Board of Health of Linthwaite, who were the custodians of the public rights of the township, and they declared that for the Longwood Gas Company to have further powers was altogether unnecessary. They had not called a single human being from either Upper or Lower Linthwaite who had said they required to be supplied with gas by the Longwood Company. Golcar was a large district, yet not one person had been called to say that they required gas and could not get it. He, therefore, would ask the committee whether they had ever heard of a company coming to Parliament for such powers as were sought by the Longwood Company, and who yet did not bring one witness from the district which it was proposed to supply to speak in support of that claim. The company had presented no case whatever. He would, however, call a body of evidence which would be irresistible to prove that the township was already efficiently supplied; that there was not a public building, mill, or private house that was not already supplied, and that in a most satisfactory manner. To give that supply the Slaithwaite Gas Company had expended a large amount of capital, for which they naturally desired to have a return. The Slaithwaite Company was the first company in the valley of the Colne; it started in 1854. They were incorporated for the express purpose of supplying Slaithwaite, and those portions of Golcar and Linthwaite and the immediate places, which practically formed one township, with gas. It was five years afterwards that the Longwood Company came into existence, and did not include Linthwaite at all, and how much of Golcar was very doubtful. In Golcar 1½ mile of their mains had been laid for 15 years, and had needed no extension. With regard to Linthwaite, they took no powers by their Memorandum of Association at all; all they had ever done to supply it was to supply the small portion called Milnsbridge, which formed a part of their immediate district; with that exception, they had never attempted to supply any portion of Linthwaite whatever. There was, therefore, no public necessity for the extension of their mains in Linthwaite or Golcar. If there had ever been such necessity, the company had been very remiss in complying with it. He would remind the committee of the 15 millowners who were dissatisfied with their supply. On what grounds, then, could they come to Parliament and ask, not merely for statutory powers, but for power to invade a district a very long way off from their own works, and where they were not needed in the least. There was half a mile between the mains of the Longwood Company and the Slaithwaite Company, and neither company have ever attempted to go into that doubtful district, for the simple reason that they had never been asked; there was no demand. It had been said there was a certain cottage supply needed, but no proof had been given of that. It had, however, been distinctly proved that all the mills and public buildings were already satisfactorily supplied by the Slaithwaite Gas Company. Should there be any extension of buildings the Slaithwaite Gas Company could amply supply them; there was, therefore, no need for the Longwood Company to invade their territory. The Slaithwaite mains were laid to satisfy three times the demand which now existed, and three times the gas now made could be made if necessary. He would prove from the agent of the Earl of Dartmouth that the Slaithwaite Gas Company could have as much land as they might require in the future; and there was no difficulty whatever in raising their capital. He would go further and say that they were at present able to supply three times the demand which now existed, and for the next quarter of a century there would be no need for a company to enter their territory. The case lay in a nutshell. Had the Longwood Gas Company shown any necessity on public or private ground for advancing further into the district of Linthwaite and Golcar than they were at present? He submitted that they had not. If ever there was a case which called for protection, it was the case of the Slaithwaite Gas Company. As two trading companies, standing precisely on the same footing, was it not a fair and reasonable proposition that the limits of the Longwood Bill should confine that company to so much of the district as they already supply, leaving the Slaithwaite Company to the enjoyment of the district which they had up to the present time supplied to the entire satisfaction of their customers? As to the offer made to the Slaithwaite Gas Company to buy their mains and pipes, it was too ridiculous to be commented upon. He trusted the committee would protect his clients in the way which he had indicated, and not allow the Longwood Gas Company to invade the Slaithwaite territory, and take away their business in the manner in which it was proposed to do by the bill.

Mr. *Thynne*, examined by Mr. LEDGARD.

I am a member of the firm of Thynne and Thynne, of Great George Street, Westminster. I am a surveyor and land agent. I am acquainted with the district of Slaithwaite that is included in the limits of the bill. In the course of last year the Earl of Dartmouth conveyed the freehold of the land on which the Slaithwaite Gas Company is situated, to that company. There would be no difficulty in obtaining more land if it were necessary. I am a shareholder in the company, and so is Lord Dartmouth. Lord Dartmouth is the freeholder of all the land in that district. I go down there to collect the rents, and have never received any complaint from any of the tenants. I presume they are satisfied with the supply they obtain. As a surveyor, and acquainted with the district, I can say that there is no need in that part of Golcar and Upper Linthwaite for the introduction of another gas company. So far as I know, the public streets, bridges, and buildings are sufficiently lighted by the Slaithwaite Company. I have heard no complaints from our tenants on the subject. The Slaithwaite Company, as far as I can form an opinion, has been of great public advantage to the district generally. The company was started in 1854.

Cross-examined by Mr. SOMERSET, Lord Dartmouth thought it might be well to start a company to supply the public of that district with gas. I live at 11, Great George Street, Westminster. I go to Linthwaite twice a year regularly, and at other times occasionally, and I am about the place a good deal when I am there. Lord Dartmouth's property is not in Linthwaite or Golcar. It is not within the limits we propose to take. All my evidence is about some other district entirely.

Re-examined by Mr. LEDGARD: Lord Dartmouth's property adjoins Linthwaite, and practically it is but one district.

Mr. *G. Dyson*, examined by Mr. LEDGARD.

I am chairman of the Linthwaite Local Board of Health. I am a large manufacturer in the township of Linthwaite, employing 300 hands. When the notices of this bill appeared, I had various conversations with other manufacturers and millowners about it, and also with the incumbent. We eventually had a meeting on the 4th of February, and I was in the chair. At that meeting resolutions were proposed to oppose the Longwood Bill. The chairman of the Longwood Gas Company was at that meeting, and was asked to address it, but declined. After that the local board convened a meeting. The local board afterwards affixed their seal to the petition, and we opposed the bill. Our meeting was called at the instigation of the ratepayers, most of the leading firms and manufacturers were present. I do not know of any public requirement for the Longwood Gas Company to go into Linthwaite. As chairman of the local board I have the supplying of such public lights as are necessary. Our board does not think it necessary for any other company to go into that district. I am supplied at the present time by the Longwood Gas Company. My works are close to Messrs. Armitage's works, the works lately bought by the Longwood Gas Company. No one has ever suggested to me that there is any need for another gas company in Upper Linthwaite beside the Slaithwaite Gas Company. If there was any necessity for another gas company I should have heard of it. I have never heard a single person in Upper Linthwaite, or in any other portion beyond Milnsbridge, say that another gas company was required.

Cross-examined by Mr. SOMERSET: I am the chairman of the local board. Linthwaite has a population of about 5000. I was in the chair at the meeting alluded to. I did, in the speeches which I made, object to the bill on other grounds than that of price. I objected on the ground of impurity of the Longwood gas. I said it was of the utmost importance that the gas should be good in quality. I am not aware that at present the Longwood Gas Company can supply us bad gas as they like. I am aware that under the proposed bill the company will be bound to supply 14-candle gas. I do not think that that is an improvement to the public. If, instead of supplying 8-candle gas you were to supply 14, that would be a benefit to the public. I know that at this moment the Longwood Gas Company can charge 10s. per 1000 cubic feet if they like. I think limiting the charge to 6s. as a maximum is an advantage. The virtuous people at Slaithwaite charge 5s., Longwood charges 4s. 6d., therefore in that respect Longwood is decidedly superior; but as to the street-lamps, Slaithwaite charges 2s. less than Longwood. The Slaithwaite Gas Company did get up a petition. They got 126 people to sign it. The local board did not have a petition, but they assented to the Slaithwaite petition. We did not appear before Standing Orders as a local board. We did not call a meeting of ratepayers and ask them if they wished to oppose this bill and have it paid for out of the rates. The reason we did not call it was not that we knew they would not agree. I had no reason for calling one unless I was asked to do so, and yet we come here to oppose this bill.

Re-examined by Mr. LEDGARD: we did, as a matter of fact, as a local board, independently of sealing this petition, present a petition in the ordinary recognized form against the bill as a local board.

MONDAY, APRIL 19.

Mr. *John Mellor*, examined by Mr. LEDGARD.

I have resided in Slaithwaite all my life, and am well acquainted with Slaithwaite, Golcar, and Linthwaite. I am one of the directors of the Slaithwaite Gas Company. I acted for three years as secretary, and since then I have been a director. I have taken a leading part in all the deliberations of the board. I produce the deed of incorporation of the Slaithwaite Company. Our original capital was £2000, in 400 shares of £5 each. We contemplated from the first supplying not only Slaithwaite, but also parts of Golcar, Linthwaite, and Lingard. Slaithwaite and that part of Golcar immediately adjoining, and Linthwaite are practically connected together, and are one township to all intents and purposes. The Longwood district extends half a mile into Linthwaite and similarly into Golcar. The Slaithwaite railway station is just outside the limits. It is supplied by the Slaithwaite Gas Company. We were registered under the Joint-Stock Companies Act, in February, 1864. We have extended our capital from time to time to meet the requirements of our business. Our present authorized capital is £20,000. £6500 of that has been issued in shares, and £2920 borrowed on debentures. There would be no difficulty whatever in raising the unissued portion of our authorized capital. Our last shares were issued at a premium. They are regularly taken up in the district. Our company was the first gas company that was established in the valley of the Colne. Slaithwaite is five miles from Huddersfield. It is 2¼ miles in a direct line from Longwood, and 2½ miles by the turnpike road. Our easternmost mains from Slaithwaite go in the direction of Huddersfield as far as the church, which is 1½ mile from our gas-works; and on the Golcar side they extend a mile from the gas-works. We took great pains in the selection of the site of our works. Our site was selected not merely with regard to the requirements of Slaithwaite, but to portions of Linthwaite and Golcar; they stand within 213 yards of Golcar and 150 yards of Linthwaite. We first supplied gas to the westernmost point in Linthwaite on the erection of the works in 1855. We commenced supplying Golcar some two or three years afterwards. Some mills have been erected since, we have supplied them with gas, and have extended our mains to do so. We have from that time to the present always met the requirements of our district and the neighbourhood. We have had a great many requests from inhabitants from time to time in Golcar and Linthwaite to supply gas as the necessity arose. We have never failed at any time to meet the requirements of the district as they have been communicated to us. We have never had complaints from any of our customers. If any complaints had been made they would have come under my notice. We supply seven mills in Golcar, and that is all the mills there are on this side of Heath Hill Brook. Our mains have been laid with a view of meeting any demands in the future. Our mains and pipes are sufficient to supply, not only all that district and Golcar on this side of Heath Hill Brook, but three times as much. With our present works we have the power of supplying three times as much gas as is at present supplied. As to the nature of the district, as you go from the margin of the river the dwelling houses are exceedingly sparse, sometimes a quarter of a mile apart. There has never been any demand made to us from Golcar which we have not supplied. I cannot conceive that in the future there will be any demand for gas between Heath Hill Brook and Slaithwaite which we shall not be able to meet. We have laid out our mains and pipes to supply all that portion. A short time ago we laid out £3600 in order to meet the requirements of the district as they arose. There is no extension of mills or manufactures going on in that part of Golcar now. If there should be in the future, our company can readily and easily supply it, and we should wish so to do. It is with that object in view that we have increased our capital from time to time. I am not aware of any request having been made by anybody, either in Golcar, Linthwaite, or Slaithwaite, with which our company have failed to comply. We supply gas to some cottages in the westernmost part of Golcar. They do not require any considerable amount of gas; some of them only consume to the amount of 1s. 6d. a quarter. Should there be an increase of that kind of property in Golcar, we should be able to supply them on the same terms as at present. There is certainly no necessity for another company in the district. In Linthwaite we supply the whole of the cottage property from the westernmost extremity to what is called Middle Linthwaite to Linthwaite Church, for about 1½ mile. The distance between the extremity of our pipes and the extremity of the Longwood gas-pipes is half a mile. We charge 5s. per 1000 cubic feet. We reduced the price to 5s. twelve months ago. There is a discount off that which brings it down to 4s. 9d. Some short time back, when the Longwood Company were charging 5s. 6d., we were then only charging 5s. We are willing to reduce our price from time to time in accordance with the state of trade and so on. The streets and bridges are supplied by our company, also the railway station and the crossings. With the exception of Mr. Malleson, who makes his own gas, we supply all the district. The bill proposes to take one-third of the township of Linthwaite. As to dividends, we have had all conditions, from nothing up to 10 per cent. The company has been managed with a strict regard to economy, the directors only getting a guinea a year each. I was one of the deputation to the Longwood Gas Company, remonstrating with them upon the provisions of their bill. We asked for an interview, and they granted us one. We took our plans, and submitted that we thought it a hardship that they should try to overlap us by their works, and come into the part of a district which was already supplied. They coincided with what was said, and one of the gentlemen present said that they had no intention of doing so. He said it would be much better if disputes of this kind could be settled amicably, and that we had taken a right course in going to see them, and he hoped there would be no opposition. We did not get our offer acceded to. We have had no offer from them except that of Mr. Owen. As to that offer to buy our mains and pipes, it would be nothing but a needless attack upon the company. We could not part with any portion of our property without serious loss, inasmuch as about half our revenue is derived from the Linthwaite and Golcar side. The persons who signed the petition are influential people; they are the leading manufacturers. Down to the time of the notices of this bill we had always acted amicably with the Longwood Company. We have always had permission to lay our mains and pipes; indeed, they have been laid at the request of the inhabitants of the two townships.

Cross-examined by Mr. SOMERSET: Our discount varies according to the amount of the gas bill. The average reduces the price of the gas to 4s. 9d. We take off an average discount of 5 per cent., but it varies. I do not manage the books. The bill you direct my attention to has no discount taken off, because it is less than £5. I do not know that the Longwood Gas Company take off 2½ per cent. to small, and 5 per cent. to large consumers.

Mr. *Charles Thornton*, examined by Mr. LEDGARD.

I am the present chairman of the Slaithwaite Gas Company. Our late chairman, Mr. Varley, died suddenly a fortnight ago. I have been a director for some time, and before that was secretary. I am intimately acquainted with the affairs of the company. On a bill of £100 we allow 10 per cent. discount. On one of £50, 7½ per cent. The lowest discount that is taken off any amount is 2 per cent. Our company has reduced the price of its gas from 7s. 6d to 5s. It has always endeavoured to meet the requirements of the district, including portions of Golcar and Linthwaite. I have heard the evidence which Mr. Mellor has given as to the requirements of the district. Our company is able and willing to supply any demand that may arise in those portions of the district referred to. Our extensions have been made from time to time with that object, at the request of the inhabitants of Linthwaite and Golcar.

Mr. *Ely Mallinson*, examined by Mr. LEDGARD.

I am a woollen manufacturer at Spring Grove Mills. We employ about 300 hands. Our works are about a mile from the Slaithwaite Gas Company. We make most of the gas which we use, but we are in part supplied by the Slaithwaite Gas Company. I am a member of the Linthwaite Local Board. We have a portion of our gas from the Slaithwaite Company, because we cannot make sufficient, and have no room to extend our works. We have been satisfactorily supplied by the Slaithwaite Company. The proposal of the Longwood Gas Company to come into the Linthwaite district has met with a good deal of discussion on the part of the inhabitants; we have had a local board meeting on the subject. I was one of those in favour of the local board signing the petition. That petition, as far as I know, does represent a considerable portion of the inhabitants of Linthwaite. Those who signed the petition are leading inhabitants and manufacturers. There is no necessity whatever for any other gas company to come into the district of Linthwaite either on public or private grounds. The Slaithwaite Company, as far as I know, have always complied with the requirements of the district.

Cross-examined by Mr. SOMERSET: I make gas and sell it for the supply of a few cottages. We do pay 5s. to the Slaithwaite Gas Company, and charge our cottagers 7s., but when we commenced supplying gas we were the only gas producers, and we found that 7s. was the price charged elsewhere. We consider the price of 7s. not to be too much, as we have to lay down mains and pipes, and have to lose by leakage, and in other ways.

Re-examined by Mr. LEDGARD: Most of the cottages we now supply with gas are outside the district which the Longwood Gas Company propose to take.

By the REFEREE: On an average, our gas from the Slaithwaite Gas Company comes to £141 a year; the price is 5s., subject to discount. We get a discount according to the amount of our quarterly account; the last was at the rate of 5 per cent.

Mr. *Joseph Shaw*, examined by Mr. LEDGARD.

I am a member of the Golcar Local Board of Health, and one of the firm of Shaw and Bray, in Golcar. In 1863 we applied to the Slaithwaite Gas Company to supply our mills; they have continued to supply us to the present time. It is a satisfactory supply. We have no complaint to make whatever. The mains of the Longwood Gas Company are 1¾ mile from our mills. I have lived in Golcar all my life. I am well acquainted with the district and its requirements. There is no necessity whatever for any other gas company to go into the district. That portion of Golcar, as far as it requires gas, is supplied already by the Slaithwaite Gas Company, and mains are put down to supply those parts not already supplied. As far as I know, there is no case in which the company have been applied to for gas and have not supplied it. I have been for 15 or 16 years a member of the local board. The streets, the railway station, and all the public buildings in that lower part of Golcar are supplied by the Slaithwaite Gas Company. I have not the least interest in the Slaithwaite Gas Company.

Mr. *Charles Shaw*, examined by Mr. LEDGARD.

I am a spinner, and have works in Golcar. I am supplied with gas by the Slaithwaite Gas Company. We first applied to them for a supply in 1870. They have supplied us since that time. We are satisfied with the supply of gas which they give us. Before we were supplied by the Slaithwaite Company we had our gas from a private firm, but they gave up making it. Our works are about a mile from the Slaithwaite Gas Company. I have no interest in the Slaithwaite Gas Company. As far as I know, as an inhabitant of Golcar, the necessities of the district lying between Heath House Brook and Golcar are sufficiently supplied by the Slaithwaite Gas Company. I have no complaints to make against the company. Last year we acquired the freehold of our gas-works from the Earl of Dartmouth, with a view of coming before Parliament next session for powers similar to those of the Longwood Gas Company. We have pledged ourselves to come next session.

Mr. *W. C. Holmes*, examined by Mr. LEDGARD.

I am the consulting engineer of the Slaithwaite Gas Company. We have spent between £6000 and £7000 in the extension of our mains. We supply about 9 million feet per annum. We have power with our present works to supply nearly 50 million per annum. Our largest supply has been 51,500 feet, and we have retorts to supply 150,000. We have room to store 1000 tons of coal. The works are undoubtedly very suitable for the supply of gas to that district. In 1869-70 we laid nearly 300 yards of new mains. We could now supply three times the demand upon us. We laid down those mains with a view to future supply, and without an increase in our supply those mains would remain unremunerative. I know the district in Golcar supplied by the Longwood Gas Company. I believe there is a considerable portion of Golcar not supplied by the Longwood Company, although within reach of their own mains. There is no increase of building in Golcar to require the existence of another company—that is, in that portion between Heath House Brook and Slaithwaite. All the mills in that part are supplied by the Slaithwaite Gas Company, except two which supply themselves. To buy the mains and pipes as proposed by the Longwood Company would be entirly ruinous to our business.

This ended the case for the Slaithwaite Gas Company and the inhabitants of Golcar and Linthwaite.

Mr. SOMERSET said it was his duty, on behalf of the promoters of the Longwood Gas Company, to ask the committee to approve of the principle of their bill, upon the evidence which he had presented, and he might add upon the evidence which had been brought forward by the other side. As to the statement that the Longwood Gas Company wished to buy the Slaithwaite mains, such a thought was never entertained. It was only suggested that if the committee gave the powers sought by this bill, then, if needful, the Longwood Gas Company would be willing to purchase simply those mains and pipes connected with the small portions of Linthwaite and Golcar which the Slaithwaite Company at present professed to supply. The Slaithwaite gas case was that they supplied Slaithwaite, which was nothing whatever to do with the Longwood district. Mr. Thynne had been called, the agent of the Earl of Dartmouth, but he said that he knew nothing about the district which Longwood proposed to supply. Another witness was Mr. Ginnethorne Dyson, the great man of the district. He was at the meeting to which so much allusion had been made; but although every means was used to obtain one, no petition was presented from that meeting. Then the Local Board of Health was applied to, and they were so apathetic in the matter that they said, "Yes, if you will pay our expenses, we will go up and petition against the bill." Ultimately 126 people were found, out of 11,000, to petition against the proposed bill. As far as Longwood was concerned the bill was unopposed. No one in Longwood objected to it. His learned friend, Mr. Pember, had given up opposing the preamble, simply hoping that the committee would protect his client, Mr. Hanson. If the committee thought that power should not be granted to take the land proposed, no doubt in some way or other land could be got and the district accommodated with the gas which it so much needed. But there was no valid objection to the purchase of Mr. Hanson's land. As to the residential objection, that had been given up even by Mr. Pember himself. There was the question of its value for filtration, but Mr. Hawksley, who was the chief witness for Mr. Hanson, had said that the piece of land on the right of the railway was especially well adapted for that purpose. Mr. Hawksley had also talked of telescoping, and erecting another holder on the present site of the Longwood Company, but he had never visited the works when down there, although invited to do so. On the other hand, Mr. Cawley had been consulted on the matter, and had carefully gone into it, and his opinion was that the proposed site was the only eligible one, and that to extend the Longwood works in that direction was absolutely required by all the circumstances of the case. It was admitted by Mr. Hawksley that it was well to have the works near to each other, and that was certainly required that in the interests of the public gas might be made better and

cheaper than it otherwise could be made. As to Golcar, the bill was practically unopposed by that district. He admitted that there was no rule for compulsory powers being given in gas bills to gas companies. Each case was made to stand on its own merits. But the practice seemed to be that in agricultural districts, where plenty of land was to be had, no compulsory powers were given; but in a district like the one under consideration, compulsory powers were often given, and it was necessary to give such powers, or the district would have to be unsupplied with gas, from the company not being able to find land on which to place their works. No one had given any good reason against the bill being passed. At present the company could practically make what kind of gas they pleased, charge any price that suited them, and divide any amount of profit possible; if Parliament gave them their bill they would be restricted, and very properly so, on all those points. He must, therefore, respectfully urge that the principle of the bill be allowed.

The room was cleared for the consideration of the committee. On the parties being readmitted,

The CHAIRMAN said that the committee found the preamble of the bill was proved.

Mr. PEMBER applied for costs on behalf of Messrs. Hirst, Hanson, and Co., who had, he submitted, been subjected to vexation and unreasonable treatment by the Longwood Gas Company.

The CHAIRMAN said the committee were of opinion that it was not a case for costs.

Legal Intelligence.

COURT OF CHANCERY.—MONDAY, APRIL 26.

(*Before the* LORDS JUSTICES OF APPEAL.)

MACDOUGALL *v.* THE GENERAL SEWAGE AND MANURE COMPANY, LIMITED.

Mr. ASTON, Q.C., Mr. CHITTY, Q.C., and Mr. LAWSON appeared for the appellant; Mr. WEBSTER, Q.C., Mr. SOUTHGATE, Q.C., and Mr. MONTAGUE COOKSON for the respondents.

This was an appeal motion, consequent upon a decision of the Master of the Rolls (who had dismissed the bill, for a new trial), on the ground that his honour's decision was based upon evidence which had been sprung upon the plaintiff by surprise; further, that the decision was altogether against the weight of evidence; and lastly, that there had been subsequent evidence improperly admitted in the case. The bill was filed to restrain the defendant company, whose works are at Coventry, from continuing to employ certain processes for the defæcation of sewage and the preparation from it of manure, under Dr. Anderson's patent, dated the 8th of December, 1869, in alleged infringement of two patents for inventions for those purposes, now the property of the plaintiff, but granted, the first to Dr. Bird, of Cheltenham, on the 20th of December, 1864, and the second to Dr. Smith, of the same place, and Mr. Bazalgette, of London, on the 23rd of November, 1868. The first patent (1864), which was the patent alleged to have been infringed, was granted for "improvements in treating sewage matters," and was described by the specifications to consist in combining a compound called sulphated clay, with sewage, by which the organic matters were deodorized and the ammonia fixed so that the organic matters could be precipitated with the clay, leaving the water pure. Then a further application of sulphuric acid, or sulphated clay, with the precipitated matters was made in order to render them more suitable for manure. The specification then stated that the mechanical arrangements for mixing and regulating the supply of sulphated clay in proper proportions with the sewage might be varied, but the progress pointed out was to sift the clay through a coarse sieve, and then mix it with sulphuric acid of 1·840 specific gravity in the proportion of 1 ton of the acid to 9 of the clay. The sulphated clay was then dissolved at the rate of 100lbs. of clay in 250 gallons of rain water, the mixture to be then passed through tanks to allow of precipitation, with or without the addition of such agents as lime and burnt chalk. The next patent, of the 23rd of November, 1868, had been granted for "improvements in deodorizing and manufacturing manures from sewage and other foul waters, and in the apparatus employed for that purpose." According to the specification of that patent, the sewage was to be introduced into settling-tanks through openings at different heights to obviate any disturbance in the precipitation, a horizontal rotary motion being given for the purpose of communicating a slow horizontal movement to the fluid at the surface. The employment of conduit-pipes, chain buckets, drying-beds, and filters, and the use of precipitating marl clay, or such refuse as miners call "tipe," with wood or coal ashes and sulphurous and hydrochlorus acids, formed part of the invention. It was claimed that 200lbs. of defœcating or precipitating mould would be sufficient to treat the daily sewage of a population of 10,000 persons. These patents having become the property of the plaintiff by assignment, Mr. Macdougall, in June, 1874, learnt that the defendants were issuing advertisements in reference to their works at Coventry, where, upon inquiry, he ascertained that they were using what he alleged to be practically the same processes as those protected by his patent, though described by them as the invention of Dr. Anderson, under a patent obtained in December, 1869. The defendants repudiated the allegation that Dr. Anderson's patent was in any way an infringement of those which were now the property of the plaintiff, and at the same time denied the validity of those patents, on the ground that they were neither new nor novel, patents for precisely the same processes having been granted in 1845, 1850, and 1852, to different persons. The main feature of the defendants process appeared, from the specification of Anderson's patent, to be the employment of shale, mixed in different proportions with sulphuric acid, and the application of heat for the purpose of forming sulphate of alumina. The question at issue upon the present motion turned upon the finding of the Master of the Rolls upon the allegation of infringement, but it was attempted, on behalf on the plaintiff, to enter into the question of novelty also, so as not to be prejudiced in the assertion of his patent upon any future occasion.

Lord Justice JAMES, however, observed that after the case had in reality been disposed of upon the issue of infringement, it would be preposterous to listen to any application for a new trial on the ground of novelty apart from infringement.

After hearing the arguments in the court below, the Master of the Rolls dismissed the bill, with costs, on the ground that he was not satisfied of the novelty of the plaintiff's inventions, the specifications of which were indefinite. There was a real difference between the inventions now the property of the plaintiff and that which the defendands were working, and that being the case it could not be said that the defendants infringed the patents, assignments of which had been taken by Mr. Macdougall. His honour at the same time did not, for the purposes of his decision, go into the conflict of evidence as to what was the resulting product of the combinations, or whether it contained fire-clay or not.

The LORD JUSTICES now (without calling upon counsel for the respondents) expressed their opinion that there was not the slightest ground for asserting that there had been any surprise upon the plaintiff in the case put forward at the trial by the defendants. There was nothing but a conflict of evidence in the matter, and that afforded no reason for disturbing the verdict of the Master of the Rolls by granting a new trial, nor could they say that the verdict given was against the weight of evidence. Being satisfied, therefore, that there was no ground for disturbing the verdict upon the issue of infringement, they declined to hear any argument upon the question of novelty. The motion for a new trial must, therefore, be refused, with costs.

THURSDAY, APRIL 29.

(*Before the* MASTER OF THE ROLLS.)

POLLUTION OF THE IRWELL.—FLETCHER *v.* WILSON.

The plaintiff in this case is a riparian owner, and proprietor of Kearsley Paper Mills, Stoneclough, and the defendant is the owner of certain chemical works higher up the river.

Mr. BAGSHAWE, Q.C., moved that the defendant should give an undertaking until next seal day not to foul the water of the Irwell except during the hours of nine and eleven o'clock in the morning.

Mr. FRY, Q.C., who appeared for the defendant, alleged the existence of a verbal agreement permitting the defendant to discharge foul water from his works into the Irwell between the hours of 6.30 p.m. and 3 a.m.

After a short discussion between counsel, it was arranged that the defendant should discharge into the Irwell between the hours of 6.30 p.m. and 3 a.m. until Thursday next, when the pending motion in the suit should be brought on.

COURT OF COMMON PLEAS.—THURSDAY, APRIL 29.

(*Sittings in Banco, before Lord* COLERIDGE, *and Justices* BRETT, DENMAN, *and* HUDDLESTON.)

THE NEW RIVER COMPANY, APPELLANTS, *v.* MATHER, RESPONDENT.

Mr. PHILBRICK, Q.C., and Mr. POLAND appeared for the appellants; Mr. J. BROWN, Q.C., for the respondent.

This was an appeal from a decision of a county court judge, and the facts were set out in a special case for the opinion of the court. The respondent was the lessee of the house No. 9, Hastings Street, Judd Street, and the rent was £20 a year, the respondent paying all taxes except the landlord's property-tax. The respondent also covenanted to repair the premises, but he was allowed two years rent in consideration of doing these repairs. Differences occurred between the appellants and respondent as to the value at which the respondent's house should be assessed, the appellants contending that the annual value upon which the water-rate should be assessed was £22, whilst the respondent contended that the value should be £18. The county court judge agreed with neither of these views, but fixed the rating value at £20 a year, and found a verdict for the appellants for the amount which would be due upon that rating. It was this decision which was appealed against, and two questions were raised for the court—first, what was the principle upon which the value of the premises should be determined? and secondly, whether this value must not be settled by two justices before the county court judge had any jurisdiction to deal with the plaint.

Mr. PHILBRICK said that the county court judge held, after hearing arguments, that by the 46th section of the New River Company's Act, 1852, he could entertain the question of the amount at which the premises should be assessed; that this value was not the gross value as the appellants contended, nor the rateable value as the respondent contended; but that the proper amount was the sum which would be paid by the tenant to the landlord under ordinary circumstances; that there was nothing in this case to take it out of the ordinary rule, and therefore he gave judgment for the appellants for the amount of a rate based upon the value of £20—the rent actually paid by the respondent.

Lord COLERIDGE: Suppose we should think (which is possible) that the county court judge was right in holding that £20 was the proper amount, how are we to answer the question whether the appellants or the respondent's contention was right?

Mr. PHILBRICK could not see how, in such an event, the court could answer the question. The case raised the very important question of principle, how the water-rate was to be calculated; and the New River Company's Act stated that if the rent of a house was under £200, then the rate should be calculated at 4 per cent. on that rent; and there was a similar principle embodied in the Water-Works Clauses Act, so that the question as to the principle upon which the rate should be levied affected not only the New River Company, but every water company in the kingdom.

Mr. J. BROWN said that his client's case was that the value must be assessed by two justices before he could be sued.

Justice HUDDLESTON: Who disputes the value?

Mr. PHILBRICK: We do not. We simply say to the respondent, "We rate you at such a sum." The respondent says, "That is not the proper amount," and therefore it is his business to get the amount settled. The respondent had said that he would pay what was legally due; and therefore there was no such refusal to pay as would entitle the company to cut off the water.

Justice BRETT: I doubt whether, if you charged a man £14, and he said, "No, I will pay you only £1," you could not cut the water off. It is the practice of water companies in London to summon in the county court for the rates, instead of going before the justices, because it is thought a less harsh proceeding.

Mr. PHILBRICK said that the appellants had express power to go to the county court under their Act.

Lord COLERIDGE said that in the event of the amount of rating being questioned, either party might apply to justices to settle it.

Mr. PHILBRICK: The company's Act said that nothing should prevent them from suing in the ordinary way for debts under £50.

Lord COLERIDGE: Yes; but the question was whether the justices must not first assess what was due by fixing the amount of the rating value.

Mr. PHILBRICK: There was the question upon whom the onus rested of going before the justices; the respondent raised the dispute, and surely, therefore, it was his duty to go before the justices.

Lord COLERIDGE: Why? The Act said that when there was a dispute, either party might summon the other to have the question of amount settled. When there was a dispute, before the company could enforce the rate they must settle and ascertain the amount of the rates; and the mode of doing so was by getting the justices to fix the amount of the rating value.

Justice HUDDLESTON: When did the dispute arise—when one party said one sum and the other another sum? Did it not rest with the company to go before the justices when that dispute had arisen?

Lord COLERIDGE: The rate was to be payable according to the annual value, and if that value was in dispute, the rate would not be payable until the annual value was determined.

Mr. PHILBRICK admitted that it was in the power of a water company to go to justices to fix the annual value; but it was clearly also in the power of the respondent to get the annual value so determined.

Justice BRETT: The question was whether there was any legislation which would oust the ordinary jurisdiction of the county court.

Lord COLERIDGE thought that was hardly the question, for the company had not got the annual value. The respondent said, "You have nothing here to enforce; and the Act has pointed out how the amount is to be ascertained. When it is ascertained, then you can enforce it."

Mr. PHILBRICK: There would be manifest inconvenience in holding that, for if determining the annual value was a condition precedent to the right to sue in the county court, then there would have to be in every case a double procedure—one to ascertain the value, and another to enforce the rate.

Justice BRETT: If the justices made an order, that would probably settle the whole matter, and the amount would be paid.

Mr. PHILBRICK did not know that that would be so in this case. The company were bound to supply everybody; and if what was said was correct, whenever they sued for an amount due, they could be met by the defendant saying, "I dispute the annual value;" and in this way the jurisdiction of the court would be ousted until the amount was fixed by the justices.

Lord COLERIDGE: No; there must be a real dispute, and the county court

judge would decide whether or not there was a real dispute. Whichever party wished to put the law in force must ascertain what was due. That was a reasonable view.

Mr. PHILBRICK: The provision was intended to protect the company by giving them a summary remedy, they having to supply all persons who wanted water.

Lord COLERIDGE: But they were met with this difficulty—the Act said that they were to sue for that which was due. But what was due? It was not to be due until it had been ascertained by the justices.

Mr. PHILBRICK: It might really be due, though the defendant might say that he disputed the amount.

Justice HUDDLESTON thought that the convenient course was that the justices should fix the amount.

Mr. BROWN referred to the 68th section of the statute, which said that the water-rate recoverable should be payable according to the annual value of the tenement supplied with water, and that, if there should be any dispute, the amount should be settled by two justices. These words were imperative. It was quite true that the company had to supply poor people with water, and they would have to pay only very small amounts. The object of the Legislature was to provide a cheap and speedy tribunal to settle the value. Enactments with this view had been uniformly considered by the courts as compelling the party making the demand to go to that cheap and speedy tribunal. This was shown by *Ex parte Payne* (5 Dow. and Lon., 679); *Crisp v. Bunbury* (8 Bing., 394); and *St. Pancras Vestry v. Balterbury* (2 C. B., new series, 477). The justices were peculiarly qualified to settle the question of amount, because they were in the habit of settling assessment questions. It was not the duty of the respondent to appeal against the rate to the magistrates, as they would have to do against a rate made by some public authority. The appellants were really a private corporation, supplying people with water for their own benefit, under an Act which was given to them under certain conditions. The Act said, "You shall supply people with water at a rate fixed according to the annual value; but, if the annual value should be in dispute, the amount of it shall be settled by two justices."

Justice BRETT: Suppose that, when payment was demanded, no objection was made, that the person remained in arrear for three years; and then he was sued in the county court for 12 quarters. Could he then set up that he was assessed upon a wrong annual value, and force the company before the magistrates to ascertain it?

Mr. BROWN: That was not this case.

Justice BRETT: But it might test this case.

Mr. BROWN would rather not answer the case put without having some little time to consider it. If the county court judge thought that there was a *bonâ fide* dispute, he would then hold that the amount must be assessed by justices. He might hold that it was a condition precedent that the amount should be settled before the claim could be enforced. Suppose that the parties had agreed that it should be a condition precedent that the amount should be settled, then the court would enforce it; and surely they would hardly give less force to an Act of Parliament.

Justice BRETT: That was rather begging the question, which was whether an Act of Parliament had excluded the appellants from the ordinary jurisdiction.

Mr. BROWN submitted that, where there was a *bonâ fide* dispute about the annual value, it was a condition precedent to the company's right to recover, not a public rate made by a public officer, but an amount assessed by themselves; that they should have the amount assessed by justices; and this appeared not only upon the reason of the thing, but also upon decided cases.

Lord COLERIDGE, in giving judgment, said that he was of opinion that the decision of the county court judge should be reversed, and judgment given for the respondent. He based his judgment altogether upon the second point, which alone had been argued at any length, and which turned upon the construction to be placed upon the 68th section of the Water-Works Clauses Act. The proceedings were before the county court judge to recover the amount of a rate imposed upon the respondent. The respondent disputed the right to assess him upon £22, and claimed to be assessed at £18, the amount upon which other rates were levied. He gave his reasons at length, he communicated with the secretary of the New River Company, and he tendered more than once the sum which he said was due upon the annual value which he contended was the correct one. The company declined to accept his view of the annual value, or to accept the sum which he tendered upon that footing, and brought this proceeding before the county court judge. Now, was the county court the proper tribunal to consider this question at all? He found that in the New River Company's Act, the Lands Clauses Act, and the Water-Works Clauses Act of 1847 were incorporated. The last Act, the 10 & 11 Vict., cap. 17, contained this section—that water-rates, except as thereinafter and in the special Act mentioned, should be paid by and recoverable from the person receiving or using the supply of water, and should be payable according to the annual value of the tenement supplied with water; and, if there should be any dispute as to such value, the same should be determined by two justices. It was not disputed that in this case a *bonâ fide* dispute had arisen as to the annual value of the house upon which the rate was to be paid, prior to the beginning of the suit or proceeding before the county court judge. According to the 68th section, where the annual value was in dispute, the amount should be settled by two justices. It seemed to follow, therefore, that, before the New River Company could enforce the rate payable in reference to a matter which was in dispute, and the amount of which would vary according as that dispute should be determined, they should get the question determined by two justices. This, and this only, was what he desired to be understood to decide in this case. Where there was a *bonâ fide* dispute, known to both parties, as to the matter which had to be determined before the rate was payable, it must be decided before the county court judge should proceed. It was enacted that, where the water-works were in England, so much of the Railway Clauses Act of 1845 as had to do with the matters to be determined by justices should be incorporated with the Water-Works Clauses Act. One of the incorporated clauses said that, in cases of compensation or other matters referred to the determination of justices, either party might summon the other before the justices, who should determine the question. This legislation, though somewhat complicated, worked out with perfect simplicity in reference to this particular case. The company asked to enforce a rate; the respondent said, "I dispute your annual value, and insist that my own annual value is the right one," and it seemed to be a reasonable construction of the legislation to say that, before the company enforced a rate which was disputed they must, as a condition precedent, get the amount of the annual value settled. This being so, he was of opinion that the county court judge should not have proceeded in this case, and that there must be judgment for the respondent.

Justice BRETT said that this case appeared to him to be a very difficult one, and to require great consideration; but, in the result, he had come to the conclusion that there must be judgment for the respondent.

Mr. BROWN said he understood that Mr. Philbrick wished that a nonsuit should be entered, and he (Mr. Brown) would not object to this. The decision below, therefore, would be reversed, and a nonsuit would be entered. He did not know whether it was necessary for him to ask for costs.

Lord COLERIDGE: They follow, as a matter of course.

Judgment for the respondent, with costs.

MIDDLESEX SESSION.—CLERKENWELL, FRIDAY, APRIL 30.

(*Before Mr.* EDLIN, Q.C., *Assistant Judge, and a Bench of Justices.*)

CAUTION TO GAS CONSUMERS.

Henry Ward, 33, and *Samuel Hoyland*, who had been out on bail, were charged with obtaining several sums of money from ladies residing in the Kensington and Notting Hill district, between the 18th of February and the 1st of April, by falsely pretending that they were engineers of The Gaslight and Coke Company, and employed by them to supply burners to the consumers of gas in the district, adapted to the change from cannel to common gas.

Mr. BESLEY and Mr. GRAIN conducted the prosecution; Ward was not defended by counsel; Mr. MONTAGU WILLIAMS, Mr. DE MICHELÉ, and Mr. VIVIAN appeared for Hoyland.

In the course of the trial it was stated by Mr. MONTAGU WILLIAMS that he could not ask the jury to disbelieve the ladies who had been called, and that Hoyland, expressing regret, would plead "Guilty" to three instances of obtaining money by saying he came from the gas company. The facts of the case, which have been already briefly given in our police report, are as follows:—On the 18th of February Ward called at 24, Alexander Square, and saw Mrs. Leslie, the wife of Mr. A. D. Leslie, and said that her husband had ordered a set of new burners from the gas company, and he had brought them. He put on one, demonstrated its superiority, and left five, for which he received 15*s.*, and gave a receipt in the name of Morley, promising to call again. He did not call again, and Mr. Leslie proved that he had never applied to the company, and knew nothing of the prisoner. Mr. Cornelius Morley, a gas engineer in London, proved that the burners, sold for 3*s.* each, were worth 6*d.* or 7*d.*, and that Ward had no authority to sign a receipt in his name. On the same day Ward called at 14, Alexander Square, the residence of Mrs. Mary Kimp, a widow, and on seeing her he represented and reiterated the false representation that he was employed by the gas company, and that the use of new burners was compulsory, or the charge for gas would not be reduced from 5*s.* 6*d.* to 3*s.* 9*d.* per 1000 cubic feet. He put on 11 burners, and when Mrs. Kimp said she would pay the gas collector, whom she expected to call in a day or two, he said he would collect his own money for the company, and unless she paid he would take the burners away. She then parted with 28*s.*, and very persistently said she would not have done so had she not believed he came from the gas company. After he was gone it was found that less light was given, and a greater quantity of gas consumed than with the old burners, and the explanation was intelligible, as the burners were bat's-wings, fit for shops, instead of fishtails, the usual pattern of house burners. On the 9th of March Ward called at 38, Blenheim Crescent, Notting Hill, the residence of a widow lady, Mrs. C. F. Walker, and in her presence and in that of Miss Grace Walker, her daughter, he said he was engineer of the gas company, and would dismiss one of the company's servants for not having left a circular, a copy of which he produced, and which was really issued by the company, announcing the reduction of the price from 5*s.* 6*d.* to 3*s.* 9*d.* per 1000 cubic feet. He there succeeded in obtaining 24*s.* for eight burners, which were of the same kind—viz., bat's-wings, and ill adapted for private houses. On the 19th of March Ward called at 33, Elgin Crescent, Notting Hill, the house of Mrs. Phœbe Squires, a widow, and by similar false representations that he was employe by the gas company and no reduction of price would be made unless the burners were used, he obtained £4 15*s.* for 24 burners, or at the rate of £28 10*s.* a gross, whereas a receipted invoice found on Hoyland showed they were bought at the rate of 36*s.* a gross. On the 22nd of March Hoyland called on Miss A. F. Browne, residing at 76, Elgin Crescent, and was joined by Ward, and they both said that they were travelling for Ward and Co., gas engineers, of the City Road, who were working a patent for The Gaslight and Coke Company under heavy penalties not to supply the burners to any one but the customers of the company, and that if the burners were not used, no complaints to the gas company would receive any attention. Only two burners were left, and 6*s.* obtained in that case. On the 31st of March Ward called on Miss Ann Smith, living at 9, St. Phillip's Terrace, Notting Hill, and asked, whether she had had the notice of the reduction in the price of gas, and when answered in the affirmative, added that unless the burners were used the price would not be reduced. In this way 36*s.* was obtained for 12 burners. On the 1st of April Hoyland called on Mrs. Mary Elizabeth Molyneux, of 16, Prince of Wales's Terrace, and by the same false representation that he came from the gas company disposed of 25, but could only deliver 17, for which he received £2 2*s.* 6*d.*, and promised to bring the eight the next day. On the 2nd of April Ward called with the eight, and was given into custody by the butler, having in his pocket a receipt written by Hoyland in the name of Ward and Co., gas engineers, for £1 for those eight burners. On the same day as the £2 2*s.* 6*d.* was obtained from Mrs. Molyneux at 16, a sum of £4 10*s.* was obtained from Mrs. A. C. Davison, at No. 3, Prince of Wales's Terrace, Kensington, by Hoyland, and when taken into custody each defendant had a directory of the district, with the names of lady residents marked, and of the several ladies from whom money was obtained erased in pencil, intending to indicate on whom to call and on whom not to call a second time.

Mr. *Thomas Carter*, chief inspector of The Gaslight and Coke Company, proved the falsity of the representations by which the moneys were obtained, and Sergeant Herne, T Division, produced a pedlar's licence taken from Ward, showing his arrival in London on the 31st of July from Oxfordshire.

The JURY found both the prisoners guilty.

It was stated that Hoyland had borne an exemplary character, and had left employment where he was in the receipt of £4 10*s.* a week in order to join Ward. The gas company had received many complaints previous to Hoyland's leaving his situation, and did not doubt Hoyland's good character.

The ASSISTANT JUDGE sentenced Ward to fifteen and Hoyland to three months imprisonment, with hard labour.

GREENWICH POLICE COURT.—THURSDAY, APRIL 29.

(*Before Mr.* BALGUY.)

UNLAWFUL CONSUMPTION OF GAS.

Mr. *Francis Edward Tucker*, proprietor of the Imperial Works, Plough Road, Rotherhithe, appeared to a summons, at the instance of the Surrey Consumers Gas Company, charging him with unlawfully using and burning gas of the company without giving notice.

At Midsummer, 1873, the works in question, which were situated in an isolated part of the parish of Rotherhithe, were relinquished by Mr. Hedley, and there was a record in the company's books that at that time the connexion with the company's main had been removed, and that a meter not belonging to the company was left on the premises. Nothing more was known of any gas being consumed at the works until the 6th inst., when Mr. Beckwith, their chief inspector, went to the place and saw workmen employed and one gaslight burning. On inquiring the number of gas-burners used, he was informed there were seven, and then found the connexion was coupled. The meter used had no hands to note the consumption that had taken place. The defendant had been in possession of the works since the month of September last. The discovery having been reported to the secretary of the company, the defendant was written to for an explanation, when he wrote a letter in which he denied having burnt any gas, as he had no occasion for it, but should require it.

Francis Murphy, one of defendant's workmen, stated that gas had been burnt, and occasionally burnt all night.

Defendant's solicitor said it was unknown to the defendant that gas had been burnt by his workmen, and that on taking possession of the premises both gas and water supplies existed, and there had been no fresh connexion.

Mr. BALGUY said he should impose a penalty of £5, but would respite the payment of it for four weeks, to enable some satisfactory arrangement to be come to between defendant and the company.

LIVERPOOL POLICE COURT.—WEDNESDAY, APRIL 28.
(*Before Mr.* RAFFLES)

CONVICTIONS FOR WASTING WATER.

George Miller, Vauxhall Road, was charged with having a defective valve in his water-closet, in consequence of which 7½ gallons per hour were wasted. The leakage had continued for no less than 19 days, the result being a total waste amounting to 3960 gallons. A fine of 40s. and costs was imposed.

Daniel Evans, 45, Farnworth street, charged with having wasted 3150 gallons of water, through a leak in a pipe in his back yard, for 17 days. Fined 40s. and costs. It was stated that the water escaped at the rate of about 15 gallons per hour.

The same fine was inflicted in the case of *Henry Foster and Son*, Waterloo Road, who were charged with allowing 3600 gallons of water to run to waste from a defective tap in a cellar.

Mr. RAFFLES said it was really shameful that people should permit valuable water to be wasted day after day without ever trying to stop it.

Miscellaneous News.

METROPOLIS WATER SUPPLY.

The following are the returns of the Society of Medical Officers of Health on the composition and quality of the metropolitan waters in April, 1875:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	19·67	0·043	0·157	0·001	14·3	3·8
West Middlesex	19·03	0·027	0·155	0·001	14·0	3·8
Southwark and Vauxhall	19·93	0·055	0·161	0·002	14·8	3·8
Chelsea	19·87	0·062	0·194	0·001	14·3	3·8
Lambeth	19·41	0·041	0·172	0·001	14·2	3·8
Other Companies.						
Kent	27·60	0·003	0·261	0·000	20·2	5·6
New River	16·57	0·013	0·160	0·000	13·5	3·3
East London	20·07	0·031	0·191	0·001	14·3	3·8

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was very slightly turbid—namely, in those of the Grand Junction, the Southwark and Vauxhall, the Chelsea, and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Society of Medical Officers of Health, 109,352,343 gallons; and the number of houses supplied was 516,514. This is at the rate of 32·2 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 31·9 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne.

HY. LETHEBY, M.B.

SINGAPORE GAS COMPANY, LIMITED.

The Annual Ordinary Meeting of Shareholders was held at the London Tavern on the 27th ult.—H. P. STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. R. King) read the advertisement convening the meeting, and the following reports and statements of account were presented:—

The directors have the satisfaction of reporting continued progress in the lighting of Singapore, for particulars of which they refer to the report annexed, from their engineer and manager, Mr. E. J. Wells, dated Feb. 26, 1875.

The directors have to announce, with extreme regret, the death of one of their colleagues, Mr. John Nicol.

The directors going out of office by rotation are—Messrs. William Henry Le Feuvre and Robert Stannard Foreman; and these gentlemen, being eligible for re-election, offer themselves for the support of the shareholders. The present auditors, Messrs. William Thomas Morrison and Alfred Williams, retire from office according to the articles, and, being eligible for re-election, offer themselves to the shareholders for that purpose.

The balance-sheet to Dec. 31, 1874, and appended to this report, shows the financial position of the company. The directors have written off for depreciation of works and plant, and off the expenses of first establishment, as per balance-sheet, at the rate of one-half per cent. per annum. The profit for the half year after writing off these sums, amounts to £1913 12s. 4d., which together with £77 4s. 9d., the unappropriated profit of the preceding half year, makes the available balance £1990 17s. 1d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax, on the amounts paid up on the preference and original capital; the balance of £38 2s. 7d. to be carried forward to the profit of the succeeding half year.

The dividend to be payable on the 20th of May.

REPORT OF ENGINEER AND MANAGER.

To H. P. Stephenson, Esq., Chairman, and the Directors of the Singapore Gas Company, Limited.

Gas-Works, Singapore, Feb. 26, 1875.

Gentlemen,—The time having arrived for me to lay before you my half-yearly report, it affords me very great pleasure to be able to forward you statements of accounts and balance-sheets, showing the working for the half year ending Dec. 31, 1874.

Throughout the half year the rates of exchange have been against the company for remitting money to England, the average rate being only 4/2¼ on six months bank bills; this has caused a very heavy loss on the amount remitted. The increase in the gas-rental has been 1204·62 dols., and the increase in cost of coals over last half year 542·23 dols.

The general expenditure remains about the same as last half year, and I think for me to take up your time by going further into details is unnecessary; all the accounts being so fully detailed in each department will give you all the information that will be required.

A charter was effected last September with the captain of the Dutch ship *Sunda*, about to proceed to Australia, to load about 2000 tons of coal at Newcastle, N.S.W., for the company. This charter was effected on very favourable terms, both as to rate of freight, and also as to time for payments, and, when they come to hand, will place the company in a good position as to the first cost of coals.

In the general works department the only expenditure has been what has been necessary for maintaining the efficiency of the works and plant.

The carrying out of the extensions in the Tanjong Pagar Road was very much delayed, as the *Andromeda*, with mains, &c., did not arrive until the 14th of October; the extension was completed, and the lamps lighted on the 9th of December.

The Municipal Commissioners have ordered further extensions, and also additional lamps, in the Campong Malacca, Tank Road and River Valley Road districts, also some additional lamps in parts of the town where there are mains. Total lamps now ordered, and not yet erected, 30, which will make, when completed, a total of 431 lamps. As soon as the *Kingdom of Saxony* arrives with mains, &c., these extensions will be carried through as speedily as possible, as I am in hopes by that time to be able to take away the outdoor fitters, who have had to be employed with the indoor fitters for some time past, as the orders could not be completed fast enough with the staff.

The engineer's report will furnish you with all the details in the carbonizing department. The loss or deficiency of gas, including the consumption on the works, has been 12½ per cent.

With reference to the collection of rental, &c., I have had under consideration for some time past the desirability of districting the town, for the distribution and collection of accounts. The accounts being made up monthly, I found it was impossible with the extended districts for the collector to do justice to them; you will find that the accounts are slightly in arrear over last half year. I have now carried out this arrangement, and the town is divided into two districts, the extra collector was appointed from the 1st of January, and I am in hopes at the close of the present half year to show a considerable reduction in the outstanding accounts. The amount collected and paid to bank for the half year upon revenue account has been 34,110·88 dols., out of amounts due for 35,751·11 dols.

The present process of purification is still working satisfactorily. The gas has been kept free from impurities.

The photometer which the Municipal Commissioners had out from England some time since, to test the quality of the gas, has been handed over to the company, and fixed in the testing-room at the gas-works; the municipal engineer to have access at all reasonable hours to test the quality of the gas.

During the half year I have made daily tests with both photometers, and the illuminating power has been maintained at 15 candles.

The fitters during the half year have all been fully employed with fitting up new houses; additional lights and alterations increase upon the half year, 33 houses, 539 lights, and 27 public lamps.

In conclusion, I trust that all the accounts as forwarded will be found correct, and that the general working will have the approval of the directors.

E. J. WELLS, Manager.

Dr. *Balance-Sheet, Dec.* 31, 1874. *Cr.*

Capital—				Cash at bankers, London and Singapore		£1,990 15 4
£5 paid on 2000 preference shares	£10,000	0 0		Ditto in hands of secretary		6 9 9
£5 paid on 8629 ordinary shares	43,145	0 0		Bills receivable		2,900 0 0
£3 paid on 270 ordinary shares	810	0 0		Office furniture		149 14 6
£2 paid on 25 ordinary shares	50	0 0		Cost of works & plant, as per last statement	£32,998 7 10	
				Add, extensions during the half year	1,068 14 0	
10,924 shares	£54,005	0 0			£34,067 1 10	
Debenture bonds	6,620	0 0		Depreciation at the rate of ½ per cent. per annum	82 9 11	
Sundry creditors	2,625	18 2				33,984 11 11
Insurance reserve-fund	42	0 7		Purchase of land		1,118 2 8
Profit and loss	1,990	17 1		Retort account		1,145 1 5
				Meter renewal account		178 15 11
				Stock on hand		9,158 5 1
				Amounts charged to capital for travelling expenses, rent, preliminary expenses, and interest on capital during construction	£10,840 5 11	
				Less amount previously written off	526 13 3	
					£10,313 12 8	
				Less amount written off during this half year, at the rate of ½ per cent. per annum	27 0 0	
						10,286 12 8
				Gas, meter-rental, fittings, and sundries under collection to Dec. 1		1,691 3 1
				Gas, meter-rental, &c., for the month of Dec., and gas for public lamps for the half year		2,326 4 3
				Sundry debtors		195 4 6
				Travelling expenses, suspense account, and sundries		152 14 9
	£65,283	15 10				£65,283 15 10

Profit and Loss Account, from July 1 *to Dec.* 31, 1874.

Coal carbonized	£2,721	18 1	Balance at profit and loss, June 30, 1874		£1,927 17 6
Lime and oxide	19	1 5	Less amount declared as dividend, after deducting income-tax on ordinary and preference shares	1,850	12 9
Trade & general charges	299	4 0		£77	4 9
Rent, rates, and taxes	87	6 2	Gas and meter rental	5,532	18 10
Directors and auditors	205	5 0	Products, profit on fittings, and sundries	1,567	19 10
Salaries and collectors commission	594	0 10			
Wages	339	13 2			
Interest on loans and debentures	318	1 11			
Loss on exchange	358	15 10			
Bad debts and allowances	49	10 0			
Retort account	50	0 0			
Meter renewal account	30	0 0			
Depreciation on works and plant, & expenses of first establishment written off	109	9 11			
Office furniture	5	0 0			
Balance—profit for appropriation	1,990	17 1			
	£7,178	3 5			£7,178 3 5

The CHAIRMAN: In moving the adoption of the report, I may say that, taking our balance-sheet, you will find that, as compared with that of last June, there is an accession of capital equal to £4240. This arises from the fact that we have made some calls upon our unpaid shares, and that we have also allotted some shares, fully paid up, at Singapore, thinking it very desirable that we should increase the number of our shareholders in the district where our consumption lies. On the debtor side of the capital account you will find that the "Debenture bonds" are £800 less. Some that had fallen due we have paid off, and others we have renewed at a less rate of interest. We are renewing some at 6 per cent, and we hope ultimately to get them out at 5 per cent. Our "Sundry creditors" are £285 less. On the other side of the balance-sheet we have £3558 more cash in hand. That amount we have at present in money, but, owing to the extensions which you see referred to in Mr. Wells's report, and which extensions were not fully carried out at Christmas, and the advantage of which we have not yet realized, this cash will, of course, be absorbed. These are the only points in the balance-sheet that I need mention, except that I may say we have £1783 less stock in hand, which is a good feature. Turning to the profit and loss account, the only items that call for any remark are—first, that the coal carbonized has increased £122; but, on the other side, we have £260 more gas-rental, as representing that additional quantity of coal carbonized. The ugly feature in our profit and loss account is the large amount of "Loss on exchange," which this half year is £226 more than in the half year ending in June last. That, of course, is a matter over which we have very little control, and we can only hope it will decrease in the future. We propose to pay a dividend of 7½ per cent., though you will observe that, whereas on previous occasions we have written off 1 per cent. for depreciation, on this occasion we only write off ½ per cent. That fact we must bear in mind, and when a favourable opportunity arrives we must make it up. With these remarks I move—"That the report, with the balance-sheet appended thereto, be received, adopted, and entered on the minutes."

Mr. COLLARD seconded the motion, which was put and carried.

The CHAIRMAN moved—"That a dividend be declared on the preference and ordinary shares at the rate of 7½ per cent. per annum, less income-tax in both cases, on the amount paid up on the shares, from the respective dates of pay-

ment to the 31st of December, 1874, and that such dividends be payable on the 1st of May next."

Mr. LE FEUVRE seconded the motion, which was agreed to.

On the motion of Mr. RICE, the retiring directors were re-elected.

On the motion of Mr. HUNTER, the retiring auditors were re-elected, and their remuneration fixed at ten guineas.

The CHAIRMAN: Gentlemen, I have now to move the stereotyped resolution—"That the thanks of the shareholders be given to the local committee at Singapore, and to Mr. Wells, the engineer, for the manner in which they have conducted the business of the company." Although, as I may say, we are not what is called a very brilliant company, yet we have always aimed at making our dividend a regular dividend, and I hope, in time, to make it as safe as Consols. We have not arrived at that yet, but when we have succeeded in making our monotonous 7½ per cent. equal in security to Consols, you will agree with me that we shall have done well. I am quite sure that the energy of Mr. Wells, at Singapore, has been always directed to your interests; and I may say again that we consider it a great advantage to have a local committee there. You will, I trust, therefore, give them a cordial vote of thanks.

The resolution was put, and carried unanimously.

Mr. RICE: As the ordinary and preference shares are now paying the same dividend, I should like to ask whether shareholders can convert their preference into ordinary shares.

The CHAIRMAN: No. The original arrangement was that the holders of preference shares should have the power of conversion within five years. That five years expired some time ago, and the conversion was not effected. We should now require an alteration of our articles, and the concurrence of two general meetings, for the purpose.

On the motion of Mr. HUNTER, seconded by Mr. RICE, a cordial vote of thanks was given to the directors for their services.

The CHAIRMAN, in acknowledging the vote, said: The directors thank you very much for your kindness, and will do the best they can to promote the prosperity of the company. We are not always able to control figures; we must put them before you as they come to us, but we shall always devote our best energies to serve you. I believe that the extensions we are carrying out will begin to bear fruit, not perhaps in the next, but in the following half year. We have coals and freights from Australia lower, and if we have a more favourable exchange, as we hope to do, our position will be extremely satisfactory.

WELLINGTON (NEW ZEALAND) GAS COMPANY.

The Fifth Annual General Meeting of the Shareholders in this Company was held on Feb. 1 last—The Hon. C. J. PHARAZYN, M.L.C., in the chair.

The report of the directors which was presented was as follows:—

The directors, in reporting to the shareholders the result of the company's operations for the year 1874, have the satisfaction of informing them that the profits for the year have equalled their expectations. The returns for the first six months showed a falling off, consequent on the reduction in price. The Government consumption has been smaller than usual, but the profit has nearly equalled that of the previous year. The high price of coal and wages has continued, but the quality of the coal having been superior to last year, a better yield of gas per ton has been obtained.

The actual profit for the year is £2836 11s. 6d., which, with £459 8s. 7d. brought forward, gives an available balance of £3296 0s. 1d. Of this amount £1000 was appropriated to pay an interim dividend of 5 per cent. on the fully paid-up shares in June last, with the balance the directors propose to pay a further dividend of 7½ per cent. on the fully paid-up shares, making 12½ per cent. for the year; and on the new shares, a dividend at the rate of 10 per cent. from the date of payment of calls; these payments, with the interest on calls paid in advance, will absorb £1660 9s. 8d., leaving a balance of £635 10s. 5d. Of this, £500 will be added to the reserve, and the balance, £135 10s. 5d. carried forward.

During the year the mains have been extended in various directions to a total extent of nearly one mile. A new retort-house, with four ovens, has been built, and was partly used last winter; the coal store has been extended to allow the storeage of larger quantities of coal.

Upwards of 100 new services have been fitted during the year, being equal to about 1300 burners added to the system.

In view of the rapid increase of the company's business, the directors have deemed it necessary to purchase the adjoining acre. The capacity of the holders will soon be insufficient for winter consumption, and a new holder and other additions to the plant will be required to provide for the continued increase, more space for the works was thus urgently required.

Mr. J. R. George, the engineer and manager, has forwarded to us the annexed statement of unaccounted-for gas since the company commenced work:—

Date.	Returns.	Used in Works and Unacc.-for.	Total Manufactured.
April to Dec., 1871 . .	2,421,280	.. 324,840	.. 2,756,120
,, ,, 1872 . .	5,260,590	.. 391,920	.. 5,652,510
,, ,, 1873 . .	8,070,140	.. 771,530	.. 8,841,670
,, ,, 1874 . .	10,064,100	.. 667,680	.. 10,731,780
			27,982,080

The length of mains in use is somewhat less than nine miles.

SHEFFIELD UNITED GASLIGHT COMPANY'S NEW OFFICES AND SHOW-ROOMS, ETC.

We copy the following from the *Sheffield Daily Telegraph* of Saturday, the 1st inst.:—

The Sheffield Gas Company enter into the occupation of their new offices on Monday next. This building, commenced late in the summer of 1872, is now completed, and, forming as it does one of the most important features in the aspect of our town, calls for a detailed description of its style and arrangement. First, then, we will explain the accommodation provided. We propose to enter at once by the principal doorway in the Station Road, and to describe the apartments as they present themselves, and afterwards we will describe the exterior architecture, &c. A porch is formed within the arch of the great doorway, and a stone screen, with two doors, one for entrance, the other for exit, faces the visitor on entering. Access is through this porch given to the vestibule, or hall, which is 24 feet by 16 feet, and 18 feet high. On the right hand are doorways leading to the two apartments appropriated to the manager, each being 16 feet by 16 feet, and communicating with each other and with the general office. This is a noble apartment, being 53 feet by 42 feet, and 30 feet high to the ceiling. In the centre is a dome, 25 feet in diameter, for the double purpose of ventilation and light. The ceiling is coved and panelled; the sides are divided by Corinthian pilasters, betwixt the arched-headed windows by which the room is lighted on three sides. On the fourth is the great entrance—a frontispiece of stone, richly carved, with a curved pediment, in which is placed a clock. The doors are folding, and the upper panels are glazed. This apartment (the largest of its kind in the town) is arranged with a central dock or space for the public, and counter round three sides; and within the space to be occupied by the clerks there is accommodation for the whole staff. The desks and counters are of Spanish mahogany, and well executed by Messrs. Johnson and Son, of Barker Pool. All these arrangements have been carried out from the special instructions of Thomas Roberts, Esq., the indefatigable and able manager of the company. Returning to the entrance-hall, on the left hand is the complaint and order office, 21 feet by 18 feet, and this opens into the show-rooms, which occupy all the rest of the principal front. The first or larger show-room is for chandeliers; it is 50 feet by 21 feet, and 18 feet high, and a grille, or series of iron rods, is arranged below the ceiling, from which to suspend the chandeliers for exhibition. The room is panelled all round to the height of 4 feet, and the windows are large and handsome, all fitted with wainscot. An arched opening leads to the smaller show-room, which is for smaller lights and brackets, &c. This room occupies the end of the building next to the Post-Office. It is 36 feet long, 21 feet wide, and 18 feet high. We now approach from the entrance-hall by an arched corridor 10 feet wide, and 32 feet long (which gives also access to the show-rooms), to the great staircase leading to the upper floor, in which are offices for the engineer's department, and the board-room. The staircase is of Hopton Wood stone, the steps 6 feet wide, and the landings and floor of the upper gallery are of the same material. The balustrades are of bronze, and the newel is a massive stone pedestal for a figure bearing a lamp. The ceiling is coved and panelled. The size of this gallery, including the space occupied by the stairs, is 14 feet in width, and 48 feet in length. It is in itself a fine apartment, and realizes the arrangement common in the Italian palaces, where these galleries were used as waiting-rooms, &c., to the principal apartments. On the floor commencing at the Post-Office end, we have a noble suite of rooms all opening one into another. First, the office for the engineer's draughtsmen; adjoining this the engineer's private office; to this succeeds the ante-room, and then the board-room, at the end of which are a committee and retiring rooms, and this completes the suite. The finishing of all these rooms is simple and elegant. No unnecessary ornament is applied, and the whole will, when furnished and occupied, be commodious and business-like. There is a workmen's staircase of stone from the yard to the attic communicating with each floor. The peculiar nature of the ground necessitated two floors below the level of the Station Road, and these are occupied by store-rooms, a house for the porter, and complete arrangements for the clerks and servants of the company. There is on the upper basement floor a strong-room or safe, for the books; and a lift, working direct into the general office, enables the clerks to remove the books every night and morning for safety against fire, &c. For warming and ventilation, a very complete system is in operation whereby these valuable and necessary arrangements are secured. An engine of 4-horse power is fixed on the lowest floor, which drives a fan placed adjacent to the chamber where the air is warmed, being drawn into it from the yard in rear of the building. This chamber is connected by flues in the walls with the various apartments, and the fresh air, either warm or cold, according to the season, is introduced near the floor in every case. The vitiated air is extracted near the ceiling, and extraction flues are made to communicate with the shaft from the furnace which is used for warming the air in winter, and so drawn off and discharged above the roof of the building. All this part of the work has been devised and ably carried out by Mr. W. W. Phipson, C.E., who is well known as a successful engineer for such works. Having now hastily described the arrangements in the building, we have to allude to the important invention of Mr. Dennett, of Nottingham, which has been applied in the construction of the floors throughout, and also in the ceiling of the general office. It is known as the Dennett arch. The material of which it is composed is gypsum and broken brick, turned on flat centres, and resting on wrought-iron girders at intervals. It may be said to render the building practically fireproof, and is solid and durable, and will bear almost any weight. It is much used in extensive works throughout the country. The stone which is used in the facing of the fronts is from Hollington, in Staffordshire, with an admixture of red Mansfield for pilasters, &c., and all the columns of granite are from the famous Ross of Mull, supplied by Messrs. Fenning, of Shap, being all monoliths. They are much admired for the texture and colour of this beautiful material. The jambs and arch of the great doorway are also from the same quarries. The floors of the entrance hall, corridor, and dock space in the general office are laid with Maw's tiles, from the special designs of the architects. The architectural treatment of the exterior next calls for notice. The style chosen is the early Renaissance of a Venetian type. The aim of the architects has been to produce effect by grandeur of proportion and picturesqueness of outline, the site being so well fitted for securing both these objects. The principal *façade* is 131 feet in length, upon a moulded base course, level with the site. At the upper end rests an order of coupled composite columns and pilasters, with their proper entablature, with arched-headed windows intervening. The great entrance doorway is a careful study; the supports and archivolt are of moulded granite. The cornice and entablature, richly carved, are supported by two carved athletes of good design and bold execution. Mr. Thomas Earp, of Lambeth, has executed the sculpture and carving of the entire building. The exigencies of the plan required that this doorway should be out of the centre of the composition; hence its importance as an architectural feature required care and attention. The result we think very successful. The doors are panelled wainscot, and there is in the arched head a grille of wrought iron, specially designed and very well executed.

The order of columns and pilasters is repeated in the upper storey, the windows being well designed in harmony with the whole composition. In the centre is a pediment, in the tympanum of which is carved the initials of the company and the date of the building. The Mansard roof which surmounts the whole composition gives much dignity and force to the design. At each corner of the building are turrets, 25 feet high, having niches with escallop arched heads and conical finals, and the chimneys are large, bold, and effective. The return ends of the building are continued in the same style, while the wing, so to speak, in which is placed the general office, has a special arrangement which marks its use. To give some idea of the great size of this building, we may state that from the footings of the foundations to the crest of the roof, the height is no less than 127 feet. The dormer windows and cresting have been beautifully executed in the Vieille Montagne zinc by Fox, of Limehouse. The roofs are covered with the celebrated Swithland slates, which are noted for their extreme hardness, nice tone of colour, and durability. They were supplied by Messrs. Ellis and Sons, of Leicester.

The whole of the locks and furniture, specially made and of the best quality, have been supplied by Messrs. C. Smith and Son, Birmingham. The lights for the general office and show-room have been supplied by Messrs. J. C. and J. S. Ellis, of the Norfolk Foundry, and the palisades which enclose the front, by Messrs. Marshall, Morewood, and Co. Messrs. Bunnett and Co. have fitted their well-known fire-proof shutters to the windows. Mr. D. I. Brown, of Lincoln's Inn Fields, the eminent building surveyor, has taken out the quantities of the various descriptions of work, and the contractors for the entire building in all its branches are Messrs. Chambers and Sons, already well known as the builders of the new wing at the Infirmary and the Broomhill Church of St. Mark. The contract, inclusive of fittings, was about £25,000. Mr. R. W. Payne has acted in the most intelligent and efficient manner as clerk of works, and the architects, Messrs. M. E. Hadfield and Son, have given to all the details much care and almost daily supervision.

SILICATE ENAMEL PAINT.—The vast improvement made in preserving compositions within the last few years is most important to gas companies, whose expenditure over paint forms a large item. The efforts of Mr. Griffiths (whose patent is being worked by the Liverpool Silicate Paint Company) are now being crowned with success, for those who have extensively used the paint assert, and they have good reason to do so, that it forms a hard enamelled surface, and thoroughly prevents the oxidation or corrosion of metals, and hermetically closes the pores of brickwork, wood, tile, stone, cement, concrete, and other porous materials. It has been supplied to several English and European gas companies. A certificate has been received from the Milan Gas Company, who speak highly of it. They have painted their meters inside and out; in fact, a meter can be painted in the morning, and is dry and ready for fixing in the evening, and now the Oriental Gas Company, which light Calcutta, have adopted the paint.

FATAL ACCIDENT AT THE RAMSGATE GAS-WORKS.

On the 27th ult. an inquest was held before Mr. Delasaux, coroner for East Kent, upon the body of John Philpott, aged 47, who died from injuries received through the falling of some arches at the Isle of Thanet Gas-Works, Ramsgate, on the previous Wednesday.

The first witness called was *Edward Crouch*, who said he was a stoker at the gas-works, and was employed on the 21st ult. with the deceased, who acted as foreman, in removing some arches which were to be rebuilt. It appeared to witness, who, with the deceased, was on the top of one of the arches, that there was some danger of their falling, and he told deceased so. Deceased, however, apprehended nothing of the kind, and told witness to knock away the key brick of the centre arch. On this being done, the three arches gave way, and both the men were buried beneath the brickwork. Witness became insensible and remembered nothing more. He believed they were taken out of the bricks in about five minutes, the deceased being more injured than himself. He could attach no blame to anybody except the deceased. The work was entirely under his control and management. He believed it was purely an accident; deceased had not the slightest idea it was going to fall.

In reply to questions from the JURY, witness said that there was no one superintending the works but the deceased. Deceased was a practical man in furnace work. No shores or anything else were put up to prevent the arches from falling.

Mr. *Vallon*, manager of the works, said that deceased himself built the arches which fell, ten years ago.

Henry Holden said he was foreman stoker at the Isle of Thanet Gas-Works. He was there at about half-past one on Wednesday, the 21st ult., at work on the premises. The first thing he saw when he went back after dinner was two of the stokers on the top of the arches. He told them to leave off work. He had been at work pulling the arches down. Crouch and Miller were at work "pecking" the arch, and deceased was on a ladder. Directly he got there he told the other men to knock off work because it was dangerous, and in consequence deceased came down to look at the brickwork, and said, "I think that is all right." Witness said, "I don't think it is safe. If you like to stop up there I shan't." Deceased stood on the arch all the time Crouch was knocking the bricks away, and directly Crouch knocked the key brick away the whole of the brickwork of the three arches fell, and the deceased and Crouch fell with it. They were both covered with bricks up to the chin. Witness assisted in taking them out, and helped to take Philpott home. He was a great deal more injured than Crouch. The occurrence was purely accidental. Witness could not blame any one but the deceased.

In answer to questions by the JURY, witness stated that deceased was foreman and superintendent of all the works in the yard and the stoke-hole. Deceased was never brought up to the trade of a bricklayer. He did not know whether he was a mechanic or a labourer previously to going to the gas-works. He was superintending the work of pulling down these arches.

Mr. *Valon* remarked that deceased had been employed at the gas-works for 20 years.

Mr. *W. A. Valon*, manager of the works: I am resident on the works. I am an engineer, and have the entire management of the company's works at Ramsgate, and have been so employed for a period of five years. I have been 18 years employed in gas companies in London and here—as superintendent in one company and assistant engineer in another. I am able to judge of the competency of deceased to perform the work he had to do. I have seen him at work during a period of five years. The work at which he was employed on Wednesday was not strange to him, and I considered him perfectly competent to do the work—in fact, he built the very arches the falling of which caused his death.

Several questions were put to this witness as to whether he considered deceased set about his work in a practical and proper manner. Witness said that his instructions were very explicit—that they were to take all off they could to lighten the top, and then knock away the key from the bottom, and that was the way they were working when he visited the place at eleven o'clock in the morning. He did not believe any accident would have occurred if the key had been knocked away with a pole from the bottom, and he could not account for deceased having it knocked from the top. The arch was 7 feet high.

One of the jurors, a master builder, said he had known deceased for many years, and considered him fully competent to do this kind of work—more so, in fact, than any man he could have sent to do the job. Before deceased went to the gas-works he was employed by him as a labourer, but that was 20 years ago.

After some further conversation on this point,

Mr. *J. Austen*, surgeon, deposed that he attended the deceased after the accident. He was suffering from a fracture of the right thigh. There were also many bruises about his body, and he was much shaken. The fracture was reduced, but the man passed a restless night, and he also had a great deal of vomiting on Thursday, but otherwise he seemed to be going on favourably. On Friday he complained of a violent cough, and he became much weaker in himself. On Saturday morning witness visited him, and found him sinking, and he died just previous to his second visit the same afternoon. Death resulted from the injuries mentioned, and they might certainly have been produced by the falling of a quantity of brickwork, as described by the former witnesses.

After consulting for about an hour, the jury returned a verdict of "Accidental death."

BERLIN WATER-WORKS COMPANY, LIMITED.—The undertaking of this company having been purchased by the municipal authorities, it was resolved on the 3rd of March, 1874, that the company should be wound up voluntarily. At that meeting the directors were appointed liquidators, and they were authorized out of the moneys received by them to divide £1,200,000 among the shareholders rateably in proportion to their shares. Acting on this resolution, the liquidators on the 25th of the same month, commenced the distribution of that sum, being £20 each on the 60,000 £10 shares. The whole amount has thus been apportioned, less about £960, the claims for which the liquidators have been unable to settle. The result of the liquidation to the present time is that there is still a sum of £21,160 remaining in hand, after meeting all expenses, including the payment of £2000 to the liquidators as remuneration for their services. On the 8th ult., a meeting of shareholders was held at the offices of the company, Gresham House, when the report of the liquidators was presented, in which they stated that they conceived it safe to proceed to a division of £18,000, leaving in hand £3160 over and above the unclaimed capital, and a sum of £434 of unclaimed dividends, to meet contingent liabilities, the further expense of liquidation and the costs of disposing of the unclaimed assets, which it may be found ultimately necessary to pay into the Court of Chancery. Acting on their recommendation, the meeting resolved—"That the liquidators be authorized to divide the sum of £18,000, or 6s. per share, amongst the registered shareholders who have already received £20 per share, and that the final liquidation remain in the hands of the four London directors, as liquidators, who shall have power to dispose of any balance remaining as they think fit." It was also resolved that a sum of 100 guineas each be paid to Mr. Magnus and Mr. Gelpecke, the representatives of the company at Berlin, and a similar sum to Mr. H. Gill, the engineer. Mr. Freshfield, one of the directors, remarked, in the course of the proceedings, that as probably there would be a sum of £1000 to deal with ultimately, it might be agreeable to the shareholders that a similar testimonial should be presented to Mr. Sim (the chairman), as in the case of the late Mr. Cunliffe, as an expression of their personal regard for him, and of their sense of the important services he had rendered to the company. No resolution was, however, come to on this point.

PROGRAMME FOR A ROYAL COMMISSION ON WATER SUPPLY.

The following are the subjects for inquiry by a Royal Commission, as suggested by the Council of the National Association for the Promotion of Social Science, in reference to the storeage and supply of water in all parts of the United Kingdom:—

1. The rainfall, the rivers, the ground water-line, the wells, and the several sources of supply; their variations with the years and the seasons, their chemical and organic impurities.

2. The storeage of water (if any) in lakes, ponds, tanks (natural or artificial), both of surface, river, and subterraneous water at different elevations, and the extent to which such waters now run to waste in times of excess.

3. The mechanism of distribution—by carriage, conduits, pipes; by pumping by means of steam, water, or other forces; the intermission or continuity of the supply to houses, the storeage of water in houses, and all the house apparatus.

4. (*a.*) The actual consumption.
(*b.*) The required supply.

5. The special means—both constructive and legislative—of ensuring a sufficiency of water for drinking, washing, and cleansing; for domestic animals, for manufacturers—through the year in dry as well as wet seasons, both in populous places and rural districts and villages.

6. The actual cost of water at present so supplied, and the probable cost of that required and to be supplied.

7. The commercial bearing of the question of water supply. The cost of water supplied by companies, the date of their origin, their capital, their progress, their rates, the number of houses they supply, the cost of water supplied by private individuals or otherwise.

8. The physiological and pathological effects of various kinds of water on the health, and mortality of men and animals at different seasons of the year and under different epidemic conditions.

9. To devise a *general* scheme of water supply.
(*a.*) For the utilization of storm waters; of underground water in the chalk, and other water-bearing strata; of water falling on mountainous districts.
(*b.*) For the filtration, purification, and softening of waters.
(*c.*) For their storeage where necessary, for their distribution, for their chemical and microscopical analysis.

10. The financial and sanitary advantages and disadvantages of the water supply, where required, being undertaken by
(*a.*) Municipalities or other public representative bodies.
(*b.*) By commercial companies.
(*c.*) By individual contractors.
(*d.*) By the consumers themselves.

11. The conditions under which water might be transferred from one watershed to another, and the connexion of the question with the rights of property so as to deal equitably between all parties concerned, and particularly to consider the vested rights of the different municipalities, private companies, and manufacturing and trading consumers.

12. The diversion of water for manufacturing and trading purposes to the injury of the inhabitants of the towns and districts from which water is so diverted; the effect of past legislation in securing any privileges to certain companies, towns, or districts to the prejudice of other and smaller districts.

13. The loss in rural districts and villages of the ancient and usual means of supply from wells and other sources by the working of mines and other works, and the means by which such loss may be diminished or prevented.

14. The rights of owners of limited and temporary estates in lands to erect works and provide means for the supply of water to such estates and other districts either for household, agricultural, or trading purposes, and to charge the absolute and reversionary ownership of such lands with a due proportion of the cost of such works, and the necessary conditions under which this should be done.

15. To make arrangements to secure an annual report on the water supply, and a ready means of deciding disputes between existing water companies and the communities they supply.

It is not proposed that such a commission should inquire into questions exhausted by the Rivers Pollution Commission, nor that it should lay down specific plans for the water supply of any particular town or district.

It is proposed that it should commence its inquiries with those districts in which the want of water is at present most severely felt.

CONSTANT AND INTERMITTENT WATER SUPPLY.

At the Meeting of the Institution of Civil Engineers, on Tuesday evening, April 27—Mr. THOS. E. HARRISON, the President, in the chair—a paper was read on

THE SYSTEMS OF CONSTANT AND INTERMITTENT WATER SUPPLY, AND THE PREVENTION OF WASTE WITH SPECIAL REFERENCE TO THE RESTORATION OF CONSTANT SERVICE IN LIVERPOOL.

By Mr. G. F. DEACON, M. Inst. C.E.

After explaining the general sources of waste, and the effect of intermittent service on the supply, and entering fully into the objections on sanitary grounds to intermittent service and waste of water, the author described the parliamentary powers, in reference to pipes and fittings, which until recently had been found necessary, before any corporation or company could give a constant service of water with no greater consumption per head than under the intermittent system. The Acts of Parliament in question had in effect empowered the authorities to prescribe the nature in detail of all fittings and pipes, and the works in connexion therewith, and to interdict the use of any existing fittings and pipes which in their judgment might tend to waste. The Liverpool Corporation had no such powers, and they had never been enabled to order the alteration or removal of any fitting or pipe, however defective, until seen by the inspector to be actually causing waste of water.

The author proceeded to state that ordinary house-to-house inspections had been regularly made from the year 1863 to 1873. In cases of actual waste, arising from defects, notices to repair were served upon the persons responsible for the water-rates, and such other steps were taken as the legal powers rendered available. The columns of Table A showed that though the waste-water inspectors had no doubt produced useful results, there was nothing to indicate that, by increasing their number, much further saving would be effected. Indeed, experience was adverse to the possibility of success in the endeavour to reduce the consumption materially, even while maintaining intermittent service; and the idea of restoring constant service, with the existing parliamentary powers, was generally regarded as chimerical.

It was under these circumstances that the corporation authorized the making of a series of experiments, with a view to discover the locality of a larger proportion of the waste than the house-to-house inspectors were enabled to trace. In carrying out those investigations, the mains supplying 14 districts in the most densely populated part of the town, containing, in the aggregate, about 31,080 persons, were provided with ordinary piston meters.

The experiments conducted in these districts were then explained in detail. The house service-pipes had been provided with stop-cocks under the footway, and the inspectors, by applying the turning key to the stop-cocks during the night, and placing the ear upon it, were enabled to ascertain in which of the house service-pipes or fittings water was passing to waste. The results were eminently satisfactory, for the consumption of water, which under nine hours service had been 19·5 gallons, and under constant service 33·5 gallons, per head per day, was reduced under constant service to 13·3 gallons, and subsequently to

about 12 gallons; while in one district of 2134 persons it was brought down to 6·6 gallons, without altering a single fitting which had not been found to be actually wasting water.

But in order to obtain such results over the whole district of supply, including a population of 630,000, in a sufficiently short time to ward off the expected dearth of water and to restore constant service, it would have been necessary to inspect several districts every night; and it would have been impossible to ascertain how far the closing of the stop-cocks commanding wasteful property had been faithfully performed, as no record was preserved of the change in the rate of movement of the piston-meter, except that returned by the inspectors themselves. The cost, too, of reliable piston-meters and of the necessary chambers was very great, while the expense of maintenance was considerable.

The author then devised an automatic check upon the motions, at once of the night inspectors and of the water, the cost of which was comparatively small. The instrument known as the "waste-water meter" recorded the two elements of time and rate of flow through the main, after the manner in which an indicator diagram recorded space and pressure. Thus not only was the change of velocity, induced by the closing of any stop-cock during the night, registered, but the time at which the men commenced their work, and the time at which they ceased to work, was recorded with fidelity.

In the establishment of waste-water districts, the existing arrangement of services for distribution was, as far as possible, adopted. The number of meter districts on the 10th of April, 1875, was 120, and the population under control, 306,912. A district having been selected, a sketch was prepared showing the place the meter was to occupy. A length of pipe was removed from the outlet side of the service-valve, and connecting-pipes were laid to beneath the nearest point of the footway, and conveyed the water through the meter. The cast-iron meter cover was placed in the footway next to the kerb. After a meter had been fixed, readings were taken to ascertain the consumption of water in the district under the ordinary intermittent supply. The district was next placed under constant service, and the consumption ascertained under that system, before measures for the prevention of waste were commenced. Stop-cocks were attached to the lead service-pipes of all premises, or blocks of premises, which were not already capable of being controlled from the exterior. All new stop-taps were on the screw-down principle, and the loose valve was so arranged that it could not fall out when the stuffing-box was removed. The surface cover was fixed into the upper side of the flag with Portland cement. The hinged lid was round, and large enough for a man to pass his arm down. Though all new pipes were laid 2 feet 6 inches deep, they were brought up at the stop-cocks to within arm's length, that a washer might be replaced without opening the ground.

The method of night inspection was then described. The stop-cock covers were raised, and the stop-cocks subjected, one by one, to a test to ascertain if water was passing into the premises. If, on applying the key to the stop-cock plug and the ear to the key, no sound was heard, the stop-cock was turned until nearly closed; and if water were passing, it would then, by reason of its increased velocity, make a sufficient sound to be heard. In this manner the flow due to a quick dropping could easily be detected. If noise was heard with the tap open, the tap was at once completely closed, and tested again, when, if the sound continued, there was evidence of waste on the street side of the stop-cock. Where leakages arose from defective private pipes or fittings, notices to repair were issued, unless a new washer or an adjusted wire would do all that was required. In such cases the inspector performed the work free of charge. Defective public pipes were reported, and repaired by the corporation pipe-layers. By the aid of the diagram from each district the superintendent determined the time, within a few minutes, when the inspectors commenced their work and left the district in each case, the localities of all, and the amounts of the more important leaks which had been checked, the initial night consumption, and the final amount to which the closing of a limited number of stop-taps had reduced that consumption. The diagram obtained after a night inspection showed the lowest consumption reached by the closing of those stop-cocks past which a flow of water had been detected. If a margin remained, which could not be accounted for, a special day experiment was made by the chief inspector to determine the condition of the public pipes. All the stop-cocks having been closed, the diagram was examined. If a steady line was being drawn, it was a proof of steady waste. If the horizontal line was broken here and there by a vertical line, similar to that produced by opening a tap, either all the stop-cocks had not been closed, or some house services were not provided with stop-taps. In old districts some omissions were, in the first instance, almost sure to be made; but with the help of the meter, every service was ultimately controlled. When the existence of "public waste" had thus been determined, it could generally be localized by a careful night inspection with all the stop-cocks closed. If this was not successful, the sewers were entered, and the position noted of any undue flow down a drain, or weeping through the brickwork.

It was stated that the experiments in the 14 districts commanded by piston-meters were commenced in January, 1873; but it was not until October in the same year that the first waste-water meters were fixed. In its earlier stages the system progressed slowly, but recently it had gained in speed. For some time past 12 meters, controlling about 25,300 persons, had been fixed each month; and it was found that, with one chief inspector, twelve ordinary inspectors, six labourers, and one waste-water meter inspector, and two inspectors to attend to special reports in other districts, it was easy to restore constant service to 5000 persons per week, to sustain it in the old meter districts, and to maintain the average consumption over the whole area supplied at a constantly diminishing rate.

In March, 1874, about 170,996 persons, and in March, 1875, 373,500 persons in the borough were receiving constant supply. During 1873 the maximum number of hours service to the intermittent districts in the borough was 10½; the minimum, 7½; and the average, 10. Since then the average had been maintained at 10½ hours. In 1873 the out-township supply to 91,835 persons was reduced for an average of 14 weeks to 12 hours per day. Since 1874 constant service had been maintained in the out-townships throughout the year. At the beginning of 1874 the total population supplied was about 621,000. At the beginning of 1875 it had increased to about 632,000. During 1873 the amount of water taken for all purposes excepting manufacturers supplies, measured by meter, was 5437 million gallons, or 24·42 gallons per head per day. During 1874 the corresponding quantity, measured by meter, was 5487 million gallons, or 23·8 gallons per head per day. In March, 1874, the rate of supply was about 24·21 gallons per head per day. In March, 1875, it was about 22·26 gallons per head per day.

The number of persons to whose service the waste-water meter system had been applied in Liverpool was 234,000. Taking that moiety of the districts to which attention had been chiefly given, the supply to 117,425 persons, which, under constant service, averaged 32·12 gallons, had been reduced to 15·97 gallons per head per day. If the whole population under treatment was considered, the rate per head per day to 234,000 persons had been reduced from 28·89 gallons to 16·47 gallons, which was equivalent to a total saving of 1,060,792,200 gallons per annum; and the saving thus far would have been 12·42 gallons per head per day. In Liverpool, the term "domestic consumption," had a much wider signification than in most other towns. It included all supplies for sanitary purposes, and a large proportion for business purposes, excepting only those to the larger manufactories, which were measured by meter. In other towns it was usual to confine the term to the use of water in private dwellings; and this difference would be equivalent, in most cases, to several gallons per head per day.

The system described had been tried in every class of property; and in some districts containing the best houses the saving of water had been quite as great as in any others. The policy of the present practice differed chiefly from that of the old in four particulars:—

1. By never employing inspectors in any but those districts in which the meter diagrams showed that the best results were likely to be obtained.
2. By never employing inspectors to examine any premises in which it had not been previously ascertained that waste was taking place.
3. By the detection of the more important, because the more continuous, sources of waste which were rarely discovered by house-to-house visitations.
4. By never renewing old mains except when the meter diagrams had shown that they were actually causing waste to an extent which justified the expenditure.

The work of fixing stop-cocks had been commenced before the meter system was introduced. The cost of providing and fixing new ones outside the houses, including the surface cover, reflagging, renewing defective flags, and searching for the service-pipe, was about 12s. each. The cost per 1000 persons in a town in which stop-cocks were already laid would average for the meter and fixing £14 7s. If, however, as at Liverpool, the greater proportion of the stop-cocks had to be charged to the system, the cost, including the meter, would be about £39 7s. per 1000 persons.

It was concluded that when constant service had been everywhere restored, the staff required to maintain or even to diminish the comparatively low consumption would be considerably less than at present. From experience gained in the districts already under control, there was reason to believe that, in order to keep a proper record of the condition of the whole of the town, it would then only be necessary to take on the average one meter diagram for three or four days per month from each district. The total number of districts would be about 250, and the number of diagrams per day, including those from districts under examination, would probably not exceed 20. Each day two or three districts of maximum waste would be provided with new diagrams, subjected to night examinations, and when brought below the average consumption, replaced on the ordinary list.

There could be no doubt that in low-class districts of the metropolis the waste of water was, on the average, much greater than in Liverpool; but if constant service were restored to any single district, that very fact would in a great measure create its own cure. Many of the outlets for water, which, under a few hours supply, were left continuously open, would, under constant supply, become such intolerable nuisances that the flow must inevitably be checked; and if the owners of property became aware that all cases of waste would be discovered by the night inspectors, and be watched by the authorities until the cause was removed, in the manner which they might prescribe, the district would soon show a lower consumption than under the intermittent system.

TABLE A.

Year.	Total Population supplied.	Number receiving Constant Service.	Number of Hours Service. Average, including the Constant Supply Districts.	Number of Hours Service. Average to those on Intermittent Service.	Number of Hours Service. Minimum.	Average Rate of Consumption per Head in Gallons. For all Purposes excepting Manufactories supplied by Meter. Per Day.	Average Rate of Consumption per Head in Gallons. For all Purposes excepting Manufactories supplied by Meter. Per Hour.	Average Rate of Consumption per Head in Gallons. For all Purposes excepting Manufactories supplied by Meter. Per Centage of Increase of Rate per Hour on 1860.	Average Rate of Consumption per Head in Gallons. For Trade Purposes by Meter per Day.	Number of Inspectors.	Proportion of Inspectors to a Million of Persons.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	
1860	491,449	491,449	24·	All constant.	24	27·39	1·141	..	1·43	No systematic inspection.	..	No systematic inspection.
1861	500,000	500,000	24·	,,	24	27·47	1·144	·263	1·46	,,	..	Ditto ditto.
1862	508,750	508,750	24·	,,	24	27·6	1·15	·788	1·62	,,	..	Ditto ditto.
1863	517,590	517,590	24·	,,	24	28·27	1·178	3·243	1·75	2	3·86	Regular house-to-house inspections commenced.
1864	526,586	526,586	24·	,,	24	28·35	1·181	3·506	2·07	4·5	8·55	House-to-house inspections.
1865	535,740	74,065	18·82	18	3	25·04	1·330	16·564	2·47	5	9·33	Ditto ditto.
1866	545,055	71,801	11·99	10	5	21·48	1·791	56·968	2·37	5·5	10·09	Ditto ditto.
1867	554,534	81,725	15·89	14¼	12	25·37	1·597	39·965	2·87	7	12·62	Ditto ditto.
1868	564,182	85,847	13·19	11¼	7	23·25	1·763	54·513	2·65	8·5	15·06	Ditto ditto.
1869	573,998	90,177	13·04	11	7	24·79	1·901	66·608	2·72	9·5	16·55	Ditto ditto.
1870	583,987	94,725	12·27	10	7	24·87	2·027	77·651	3·07	10	17·12	Ditto ditto.
1871	594,152	99,503	11·93	9½	7	25·98	2·177	90·798	3·37	13·5	22·72	Ditto ditto.
1872	604,415	104,515	12·21	9¾	7	24·38	1·997	76·022	3·53	17	28·12	Ditto ditto.
1873	614,962	136,058	12·22	9½	7	24·47	2·003	75·548	4·00	15·5	25·20	Last year of regular house-to-house inspections.
1874	625,830	234,956	15·57	10½	10½	23·86	1·532	34·268	4·19			
1875												
First quarter	632,643	317,747	17·28	10½	10½	22·56	1·305	14·373	4·24	15·7	25·02	Waste-water meter system only. No ordinary house-to-house inspections.
For night ending March 30	634,161	373,278	18·44	10½	10½	22·33	1·211	6·135	4·24			

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is still a wearisome dulness in almost all the leading departments of the iron trade here, and there does not appear to be any movement indicative of an early return of activity.

Pig iron remains fairly firm, not so much in consequence of the home trade, as owing to the continuance of a good export demand. In sympathy with the downward tendency of the Scotch market, some numbers of useful Cleveland brands are a trifle easier, as will be seen by the following quotations:—No. 1 foundry, 63s.; No. 2 foundry, 60s.; No. 3 foundry, 58s.; No. 4 foundry, 56s. to 56s. 6d.; No. 4 forge, grey, 56s.; No. 5 forge, mottled, 55s.; No. 6 forge, white, 53s.; refined metal, 76s.; Kentledge, 65s.; and cinder pig, 43s. per ton, for net cash. Good local pig iron is now being sold at about 62s. 6d. for forge purposes, and 66s. to 70s. for foundry qualities, the latter meeting with the steadiest demand. There is little alteration to note in connexion with the foundries, most of them being still in a tolerably active condition.

The coal trade in South Yorkshire, the Sheffield district, and North Derbyshire remains in an exceedingly quiet condition, the inquiry for household qualities having become materially less since the advent of the present genial weather. The Steam Coalowners Association met at Barnsley on Tuesday last, and after considerable discussion, it was again resolved not to make any alteration in prices, which, therefore, are as heretofore; export orders being filled at 12s. 6d. per ton, and large inland commissions at 12s. per ton. The demand is but indifferent, being for the most part on account of shipments from the Humber ports to those on the nearest points of Holland, Belgium, and France.

At a number of the collieries the topmen have gone out on strike in consequence of an attempted reduction in their wages. The owners wish to effect a drop of 7½ per cent., but the men are unwilling to concede more than 5 per cent., hence the strikes.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There has been a better attendance this week at the usual meetings of the iron and coal masters of this district, inquiries are rather more numerous, and, altogether the trade shows more animation than it has done for some weeks past; and although transactions have been limited, these indications of a reviving demand have imparted a rather firmer tone to the market. Sheet makers are generally fairly well engaged, and some of the leading houses have orders booked forward for several weeks to come. In other departments business remains decidedly dull, and the demand for finished iron generally is barely sufficient to keep the mills and forges at half the usual production. Nevertheless, makers of branded iron are understood to have determined to make no change in prices this summer in view of the present restricted condition of the labour market. Quotations remain, therefore, on the basis of £10 10s. to £11 12s. 6d. per ton for marked bars. Unmarked iron ruling from 15 to 20 per cent. lower. There is still a fair demand for all-mine pig iron, and prices are unchanged—viz., £5 5s. per ton for hot-air pigs, and £6 10s. for cold-air. In consequence of the scarcity of native ironstone, and the difficulty of obtaining suitable supplies from other districts, there has, for some time, been a gradual falling off in the make of pig iron in South Staffordshire and East Worcestershire when compared with the production of former years. In 1859 there were 147 furnaces in blast; in 1860, 135; in 1861, 114; in 1862, 108; but now there are only 79 in blast.

Foundry iron is still in demand, most of the ironfoundries of the district being in well-sustained operation.

The coal trade is inactive; the demand continues to decline, and the pits are only in partial operation, the associated masters have as yet made no change in prices, but there is a good deal of underselling going on amongst the small proprietors, and there is now also a large importation of fuel from other markets, at rates which operate considerably against the local trade.

Coal has this week been struck at the trial sinking at Fair Oak, on the northern boundary of the Cannock Chase coal-field, and which is over the belt which has bounded the hitherto proved portion of the Cannock Chase field; the trial boring at Huntington, in the same district, is proceeding satisfactorily, and the promoters are now sanguine of ultimate success. A new company has this week been launched for the purpose of developing a mineral estate of 500 acres, in the neighbourhood of the Sandwell Park sinking, and although the prospectuses have only been issued a few days, the whole of the capital (£100,000) has already been subscribed.

The wrought tube and fitting trades of Wednesbury are in a slight degree steadier than we were recently able to report, but there is not much change, and the prospect of a return to anything like buoyancy seems remote.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade is feeling perceptibly the change in the weather, and business generally is very much quieter, with supplies now slightly in excess of the demand. Underselling is going on quietly, but not to the extent of necessitating a general reduction, the leading coalowning concerns in the Manchester district having decided to make no alteration in their list rates at the opening of the present month. The house coal trade is dull, but there is not yet any great pressure of stocks to bear down the market. For furnace coal and burgy of good qualities there is a tolerably steady inquiry, the demand from the brick-making fields helping up the latter description of fuel, but common descriptions are a drug in the market, and are offering at very low rates. The average pit prices in the district are for this month about as under:—Best, 14s. to 14s. 6d.; seconds, 12s. to 13s.; best qualities of burgy, 7s. to 8s.; and best qualities of slack, 5s. to 6s. per ton, but common class burgy and slack is being sold at prices considerably below these. In the outside districts a fair business is still being done, but the waggons are not returning to the pits as quickly as they should, which would seem to indicate that there is rather a slackness in trade.

In the West Lancashire districts there has been a good deal of pressure for lower prices, and orders have been held back in many cases in anticipation of a reduction this month. Reports have been circulated that the coalowners were reducing, but this has been emphatically denied; prices, however, for large sales are undoubtedly weaker.

The gas coal trade continues to increase in activity; additional inquiries for next year's contracts are coming into the market, and some good orders have already been placed.

The shipping is still very dull, and it is with great difficulty that sales can be made at late rates.

The coke trade is without much alteration; there is a moderate demand, and very little stocking, prices at the ovens being about 20s. for best cokes, and 12s. to 14s. per ton for small cokes.

The iron trade is still exceedingly dull, and founders and manufacturers are complaining very much of a want of orders. Prices have declined about 1s. per ton, but even at this reduction buyers are very difficult to meet with. No. 3 Middlesbrough foundry pig iron is being offered for immediate delivery in the Manchester district at 65s. 6d.; No. 4, 64s. 6d.; and No. 4 forge, 63s. 6d. per ton; and for delivery over a few months merchants are quoting much less. Manufactured iron is also very dull, and prices have receded a little. Bars can now be bought readily at £8 12s. 6d.; angles, at £8 15s.; light rails, about £8; and heavy ditto, about £7 10s. per ton delivered.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England was scarcely so active last week as during the preceding week. A large amount of coal had been put aboard ship and cleared out. There hardly seemed to be so many orders on land, though a good deal of gas coal continues to be taken out to Swinemunde and some of the lower ports of the Baltic. Most of the gas shipments have been placed on board steamers. Prices keep about the same level, but loading turns have been shorter, which shows that business in this trade is not so pressing. Trade has not been so active to the North of France, and the demand for coals for London is moderate. Household coals are about an average for the time of year, without much change in prices. Best steam coals keep very firm, and a good business is doing. There is a somewhat better demand for manufacturing coals, and the coke manufacturers have the command of the market; and prices are pretty stiff. All trade disputes in the coal trade have been arranged. The men are working very steadily, and the output since prices have dropped and pitmen's wages have not been so extravagently high has improved. The men who were so disposed spend less time in drinking, and the pay Mondays, which were generally looked upon as lost at the collieries, turn out now an average production of coal.

There is not much change of any moment in the freight market. London and coasting rates are quiet, and rather favour the importer of coals.

The Baltic shipping business is a little better, but Mediterranean trade is only dull. The general course of business in shipping all tends to keep freights at a moderate figure, and to lead to the impression that this business will favour the shippers for the most part of 1875.

There is not much doing in the iron trade of this district, and a considerable shock has been given to business by the stoppage of a large iron firm in South Durham.

The chemical and general trades of the Tyne were scarcely so active last week as in the previous week. Chemicals were lower in price, and somewhat weaker in the market. There was less inquiry also for fire-bricks and goods of that description.

The importations of timber were better last week, though they are infinitely short of the numerous cargoes brought into the northern ports last year. Stocks are being reduced, and the general tendency of the timber trade continues to be in the direction of firmer rates.

From a conversation which took place in the borough of Tynemouth Town Council on Friday last, it is not likely that the North Shields Water Company will accept the £66,000 odd which the corporation valuers put on their works, and any prospect of negotiations for their purchase may be considered closed.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The chief event of the week in connexion with gas affairs, has been the annual meeting of the West of Scotland Association of Gas Managers. It was at first intended to hold the meetings of this association once a quarter, but latterly they have been held twice a year, which is found to be quite often enough, especially when it is remembered that the association is of a peripatetic character. The meeting in question was held on Thursday last, at Lanark, a town which is at a considerable distance from the residences of many of the members; but it has this advantage, namely, that it is quite adjacent to the Falls of Clyde, and is altogether in a very beautiful part of the country. As you will have your usual official report in due course, I need not dwell at any great length upon the events of the day and the business transacted. Mr. Malam, of Dumfries, the president, occupied the chair, and the ordinary formal business included among other things the election of office-bearers for the ensuing year; Mr. William Dunlop, of Hamilton, being elected president, Mr. Levi Monk, Lanark, vice-president; Mr. William Smith, Helensburgh, treasurer; Mr. Gilchrist, Dumbarton, secretary. A good deal of discussion on the Malam process arose out of a short paper communicated by the president, on the method which he is now trying for the recovery of all the ammonia produced by his method of carbonizing. Mr. Smith's report upon the process, to the Aberdeen Gas Commissioners, was frequently referred to and freely criticized, and Mr. Monk said that if the process only gave 1500 cubic feet of gas additional, it would be of great value. The paper by Mr. William Young, of the Clippens Shale Oil Works, Paisley, on "The Diffusion of Hydrocarbons in Coal Gas," was rather a remarkable one, and was illustrated by some exceedingly interesting experiments. Although that was the title of the paper on the programme of business, it only conveys a limited notion as to the nature of the subject discussed. The following may be regarded as being the scope of the paper:—"The treatment of crude coal gases in such a manner as to have diffused through them as large a volume as possible of the vapours of volatile hydrocarbons consistent with their permanency." I will not any further anticipate the pleasure which many of your readers will doubtless experience in reading the paper itself in the pages of the JOURNAL. There was a large attendance of members at the meeting, and the day was in every sense a very enjoyable one. After the termination of the business, between 40 and 50 gentlemen dined together in Clark's Victoria Hotel—Mr. Malam in the chair, and Mr. Dunlop in the vice-chair.

At the last meeting of the Greenock Water Trust, Mr. Superintendent Wilson reported that on the 10th of April the quantity of water in store was equal to 134 days supply, and that on the 26th, there were only 120 days supply, owing to the continuance of a long tack of dry weather. At the same meeting of the trust, it was stated that the millowners along the line of the aqueduct had furnished Sir John Hawkshaw, at his request, with particulars as to how the wasteages of the various mills are disposed of. That information had been requested by Sir John Hawkshaw in order that he might be able to prepare his report on the pollution of the Clyde. It was also stated that the millowners and others had given the desired information. In connexion with this matter it may be mentioned that Sir John Hawkshaw, Her Majesty's commissioner on the Clyde purification, will hold a court of inquiry in Glasgow during the week commencing the 17th of May. Persons desirous of giving information on the subject are requested to intimate their intention of doing so.

The Edinburgh water supply during the last fortnight was equal to 29·83 gallons per head per day to a population of 270,300. The rainfall at Glencorse during the period from 1st of January to 27th of April, was 9·25 inches, as against 9·60 inches in 1874, and 8·05 inches in 1873, over the corresponding period.

A very excellent supply of water has just been given to Duntocher and Dalmuir, the former a large manufacturing village, and the latter an important seat of the shipbuilding industry on the banks of the Clyde, about eight or ten miles down from Glasgow. The engineer for the works is Mr. W. R. Copland, C.E., Glasgow.

The iron market is but little altered since last report. Prices are certainly lower, the rates on Thursday and Friday ranging from 67s. 10½d. to 67s. 4½d. for pig iron warrants. There are several contracts for cast-iron pipes in the market, one of them being for 500 tons, or thereabouts, for the Grangemouth Burgh Commissioners, and another being for 4098 yards of 20-inch pipes for the Southport Corporation.

The coal market shows no improvement. Trade generally continues dull, and all kinds are difficult to sell, notwithstanding the partial curtailing of supplies on account of colliers not working steadily. But withal there is enough putting out for present demands. Several merchants are waiting anxiously for the settlement of gas coal contracts that are now open. One of them is for 13,000 tons for the Paisley Corporation Gas Commissioners.

DEATH OF MR. J. E. CLIFT.—The obituary notices in the daily papers record the death at Cheltenham, on the 26th ult., of Mr. John Edward Clift, formerly proprietor of the Redditch Gas-Works, and for 20 years engineer of the Birmingham and Staffordshire Gas Company. The gas undertaking at Redditch was two or three years ago transferred to a public company, shortly after which Mr. Clift was seized with paralysis, from which he never entirely recovered. We are not aware of the immediate cause of death. Mr. Clift was well known and deservedly esteemed in the profession to which he belonged.

DEATH OF MR. THOMAS H. METHVEN.—We record with deep regret—a regret which will be shared by many of our readers—the death of this estimable gentleman, at the early age of 44. The melancholy event took place at Bury St. Edmund's, on the 25th ult., after an illness of seven weeks. Mr. Methven was a man of sound practical good sense; he possessed a large amount of engineering skill and ability, and the lessons of his varied experience he was always ready to communicate to those who sought his advice. He had a most genial temperament, and notwithstanding his naturally retiring disposition, he had a large circle of private and professional friends, who will greatly deplore his loss. He joined the British Association of Gas Managers soon after its formation, and contributed several interesting and suggestive papers for discussion at its annual gatherings. He was elected a member of the committee of the association in 1867. To show the regard entertained for Mr. Methven in his own locality, we quote the following from the *Bury Free Press* of Saturday last: —"By the death of Mr. Thomas H Methven, the manager of the gas-works, which took place on Sunday last, Bury has lost a most useful, energetic, and intelligent townsman. Mr. Methven started in life as a railway engineer, and in that capacity went to Egypt to superintend the construction of the Grand Cairo and Alexandria Railway. He subsequently undertook the management of the Bury Gas-Works, and succeeded in raising them from the sad plight in which they then were, to their present most satisfactory position. The works as they now stand, are a monument to his exceeding great energy and skill; and the company will be fortunate indeed if they find a successor as upright, conscientious, and painstaking. Mr. Methven was also proprietor of the Bungay Gas-Works, and lessee of those at Sudbury, Needham Market, and Haverhill. He was consulting engineer to the Thetford Gas-Works; and the Loddon and Clare Companies were indebted to him for much valuable advice. He was an occasional contributor to the JOURNAL OF GAS LIGHTING, and also to the earlier numbers of "Cassell's Popular Educator." Mr. Methven added to his other duties those of the chairmanship of the Bury Permanent Benefit Building Society, which owes much to the care with which he overlooked its affairs. He was a liberal supporter of the various religious bodies with which he was connected, and they will miss in him a valued friend. As one of the founders, and for a long time superintendent, of the Ragged School, and as superintendent of the Northgate Street Chapel Sunday School for some years, he will long be remembered by those who profited by his instruction. His funeral, which took place on Thursday in the cemetery, was attended by the chairman and directors of the gas company, and by a large number of the Sunday School children and other sorrowing friends, and the Rev. Dr. Christien delivered an earnest and appropriate address at the grave."

PETERSBURG AND VIBORG GAS COMPANY, LIMITED.—A petition to wind up this company has been presented to the Court of Chancery by the Patent Gas Company, Limited, who are contributories. This petition is appointed to be heard before Vice-Chancellor Malins on the 7th inst.

POLLUTION OF THE THAMES.—It is reported that, to avoid the heavy penalties threatened by the conservators, for polluting the river Thames, the Kingston Corporation have entered into an arrangement with the Native Guano Company for dealing with the sewage of the town. The necessary works are proposed to be erected on the aits below Kingston Bridge.

TESTIMONIAL TO THE LATE SECRETARY OF THE DOUGLAS GAS COMPANY. —Mr. John Goldsmith having retired from his appointment with the above company, the directors, on behalf of the company, in appreciation of his faithful services during the past 16 years, have presented him with a superb gold watch and chain.—*Mona's Herald.*

PRESTON WATER-WORKS.—Works for an extension of the Preston Water-Works scheme have just been completed, which will give an additional supply to the town of 12 cubic feet of water per second, or 6,461,337 gallons per day. The additional supply has been obtained from the Langden and Hareden Brooks, in the neighbourhood of Chipping and Bowland. It is intended to secure additional pressure also.

WESTGATE-ON-SEA.—In a paragraph on the gas and water supply of this place (quoted from the *Builder*) in our last number, page 617, it was stated that the contractors were the "Thames Iron-Works Company." As this was inaccurate (this firm being *shipbuilders*), and likely to mislead the public, we have been requested to make a correction. The contractors referred to are the Thames Bank Iron Company, Old Barge Wharf, Upper Ground Street, Blackfriars.

HYDRANTS IN THE CITY OF LONDON.—At the meeting of the Court of Common Council on Thursday last, a report was brought up from the Gas, and Water Committee on a long-standing reference to them to consider if any improvement can be suggested in the supply of water in case of fire, either by fixing hydrants or other methods, and recommending that the committee should be authorized to take advantage of the repaving of streets or the placing standpipes in the poorer neighbourhoods of the City of London by the Commissioners of Sewers, to place additional pipes for the supply of hydrants in such localities, at an expense not exceeding £1000.

EXPLOSION OF SEWER GAS AT LEICESTER.—We learn that an alarming explosion of sewer gas occurred in the market-place at a late hour on Saturday night, causing considerable damage. The explosion took place close to a sewer grate only a few feet from one of the market mains or stall-pipes. Several stalls were knocked down, and for some time the greatest consternation prevailed. The sewer grate surrounding the pavement was completely lifted out of the ground. A granite kerbstone weighing nearly 3 cwts. was hurled for some distance, while a number of flag-stones about 40 yards off were upheaved as by an earthquake. Fortunately no serious personal injury was sustained although a number of people who were passing by at the time were knocked down and severely shaken.

HALIFAX WATER SUPPLY.—The *Halifax Courier* says: "The present dry season is making serious inroads upon the water supply at the corporation reservoirs. The last return, which is dated Wednesday, shows that the quantity of water in store that day was 541,559,000 gallons, which is nearly 20 million gallons less than was in store six days before, and more than 140 million gallons less than the quantity in store at this time last year. The water continues to be turned off between the hours of eight o'clock in the evening and five o'clock in the morning; but this week there have been two exceptions to the rule, the full supply being continued on the evenings of Wednesday and Thursday, in order that it may be tested what quantity of water is saved by turning off the water. Last night (Friday) the supply was stopped at eight o'clock."

EXETER WATER SUPPLY.—At the meeting of the Exeter Town Council on the 28th ult., a report from a sub-committee of the Sanitary Committee was presented, which stated that they had come to the following resolution:—"That it be reported to the council that the committee are satisfied, from a perusal of the replies obtained by the town-clerk, that a constant supply of water should be obtained for Exeter, the advantages arising therefrom, both in health and comfort, as well as safety from fire, far outweighing the temporary expense incurred in adopting the system, and the consumption being considerably less than under the intermittent system. But the committee feel that, as the water company indicate considerable reluctance to adopt the change, it would be well for the council to address itself at once to the greater question of purchasing the whole works of the company.

HANLEY GAS SUPPLY.—At the meeting of the Town Council, on the 27th ult., the gas examiner reported that the average illuminating power of the gas during the month had been 15·75 candles. The average of sulphur impurities had been 27·67 grains per 100 cubic feet. There had been no trace of sulphuretted hydrogen during the month. Mr. Hammeraley moved a resolution instructing the General Purposes Committee to enter into negotiations for the purchase of the gas-works, and to report to a future meeting. Mr. Baker seconded the resolution. The mayor (Mr. H. Cartlidge) said he had had a conversation with Mr. Linging, the secretary to the British Gas Company, who had expressed his belief that the directors would meet the overtures of the council in a friendly and liberal manner, and that no obstacles would be placed in the way of a transfer of the works to the council. The resolution was carried.

COCKERMOUTH WATER SUPPLY.—The Union Rural Sanitary Authority of Cockermouth having applied for a Provisional Order to enable them to carry out a scheme of water supply for Brigham, Great and Little Broughton, Greysouthen, and Great and Little Clifton, from a source at Hotchberry, in the township of Brigham, Mr. Taylor, one of the inspectors under the Local Government Board, held an inquiry at Cockermouth on Wednesday, the 14th ult. In the course of the proceedings it was elicited that in Great Broughton, according to the census of 1871, there were 216 inhabited houses, with a population of 1024; in Little Broughton there were 164 inhabited houses, with a population of 792; in Brigham there were 159 houses, with a population of 745; in Great Clifton there were 139 inhabited houses, with a population of 660; in Little Clifton there were 118 inhabited houses, with a population of 599; and in Greysouthen 141 inhabited houses, with a population of 747; making a total of 937 inhabited houses, with a population of 4567. Mr. R. Pickering (the engineer) said there was an outflow of 675,000 gallons in 24 hours. The estimated cost was £7067, and the expenditure, in addition to that for pumping to Wyndham Row, included in Little Broughton, was £3000.

DRAINAGE OF WINDSOR.— At a special petty sessions for the borough of Windsor, held on Saturday, the 24th of April, before the mayor (Mr. W. Underhay) and Mr. G. Pooley, the summons against the sanitary authority for the borough for non-compliance with an order of the Thames Conservators to discontinue the drainage of the district into the river Thames, came on for final hearing. The summons was originally taken out about two years ago, and has been adjourned from time to time on the understanding that the sanitary authorities were using due diligence to carry out the works. Mr. English now applied for the summons to be withdrawn on the payment of the costs by the sanitary authorities, and the magistrates assented. The sanitary authorities contemplate utilising the existing drains of the town, a complete system of drainage having been made about 15 years ago at great expense, and constructing a new outfall sewer, from the town through Old Windsor, to "The Ham," about two miles distant from the town, near the Castle Irrigation Farm, and there erecting works for the treatment of the sewage by precipitation. The contract for the sewer, which will cross the navigable cut which separates "The Ham" from the mainland, is £17,000. The contractor is Mr. Acock, of Oxford, and the engineer is Mr. T. Hawksley.

TESTIMONIAL TO MR. JAMES STELFOX.—This gentleman, who for many years filled the important office of manager of the Belfast Gas-Works, is just leaving Ireland to reside in England. He has been an active member and office-bearer in the Wesleyan Methodist Society for nearly half a century, and the friends with whom he was thus associated, and others, presented him with a very handsome testimonial on the 24th ult. It consisted of a beautiful epergne, together with a pair of fruit dishes, each bearing a suitable inscription. The Mayor of Belfast presided on the occasion, and one paragraph in the address with which the testimonial was accompanied was as follows:—"During your residence here, extending over a period when much of commercial progress and noble enterprise have been the characteristics of our town, you have, in your individual capacity, and also as the representative of the very important trust committed to your care as manager of the gas-works, afforded every facility to meet the increasing wants of the town and neighbourhood, manifesting a sympathy with everything that was calculated to promote its interests and develope its resources, which the public fully appreciated." Mr. Stelfox, in the course of his reply, observed: "Referring to the complimentary terms in which you have spoken of my connexion with the gas undertaking in this town, I have always endeavoured to discharge the duties of that important trust in such a manner as to secure alike the interests of my company and those of the inhabitants, and it is a great satisfaction to me, in retiring from my office, to know that my efforts have had your approval; and I sincerely hope that the future of Belfast may be attended with greater prosperity than it has yet known."

GLOSSOP GAS COMPANY.—At the bi-quarterly meeting of the Glossop Corporation on the 22nd ult., the town-clerk read a letter from the gas company declining the offer made by the corporation for the purchase of their works. The letter was as follows:—

Dear Sir,—I am instructed to apprise you that an extraordinary general meeting of the Glossop Gas Company was held this day to consider the offer made by the corporation, and that at such meeting the following resolution was passed unanimously:—"That the offer made by the Town Council of Glossop to purchase the works, property, effects, and undertaking of the Glossop Gas Company for the sum of £44,690 be and the same is declined." In forwarding you this copy of the resolution of the shareholders meeting, I am instructed by the directors to call your attention to the following facts:—viz., that it would appear, from the public newspapers, that the offer made by the council has been based upon calculations as to the quoted value of the company's shares in the market, a principle of calculation which the board believe has never yet been adopted; that the quoted price does not correctly represent the real value of the company's shares, or the sums at which the shareholders would be disposed to part with them; that such quoted prices have been materially influenced by the unjustifiable and unfair attacks which, for a considerable period past, have been made against the company and its directors at various meetings of the council, and by members of the corporation; that the price offered by the corporation will not at all bear comparison with those given from time to time, during the past few years, for various gas undertakings which have been transferred from companies to corporations, or other governing bodies; that any shareholder receiving his rateable proportion of the sum offered by the corporation could not invest on a safe security, except at a sacrifice of future income. I was also directed to apprise you that the board abstain from making any counter proposal to the council—first, because the shareholders have no wish to part with their undertaking; secondly, because many of them (being interested both as gas consumers and ratepayers) consider that they would in these characters not be benefited by a transfer on terms which would be fair to them as shareholders; and, thirdly, because (apart from the other two considerations above mentioned) the figure offered by the corporation is so inadequate as to render it improbable that were any negotiation entered into an arrangement would be likely to result therefrom.—I am, dear sir, yours very truly, W. WAKE.

On the motion of Alderman Stafford, seconded by Councillor Rhodes, the clerk was instructed to write in reply that the council totally dissented from what the directors advanced.

ROCKHAMPTON (CO. LIVINGSTONE, QUEENSLAND) GAS AND COKE COMPANY.— We have received a copy of the half-yearly report and balance-sheet of this company to the 30th of November last. In their report the directors state that the company's bill of incorporation received the Royal Assent on the 8th of July, and its provisions are now law. By this Act the company have all the powers usually granted to gas companies, and can lay down mains, pipes, drains, &c, wherever required. They can enforce summary payment of rates, fix or remove meters in the public streets and on private property, and protect themselves from any infringement of the privileges conferred by the Act. The contractor (Mr. T. A. Peterkin) having failed to carry out his contract, his sureties took it up on

the 1st of August, and have displayed great energy and diligence in carrying on the works to a satisfactory issue, in the face of many unexpected difficulties and drawbacks, principally through the temporary closing of the local foundry. The estimates and plans of the managing engineer, Mr. Wm. Smith, have been faithfully carried out, and have proved entirely correct and thoroughly efficient. The company commence business with every needful appliance for the manufacture and sale of gas, with three miles of main-pipes, and upwards of 100 services and meters connected with consumers premises, besides public lamps; and the managing engineer reports that the consumption of gas within the first twelve months is likely to be in excess of the original estimate. The total cost of works, lands, buildings, and appliances, including all preliminary charges and six months stock of coal, as shown by the statement above referred to, is £10,726, which compares very favourably with other companies possessing works of a similar capacity and extent. The price to be charged for gas has been fixed at 20s. per 1000 cubic feet. Several applications have been sent in for services beyond the limits of the company's lines of pipes, and it is likely that considerable extensions of mains will have to be carried out at an early date.

Proposed Purchase of the British Gas Company's Works at Hanley.—At the meeting of the Hanley Town Council on the 27th ult., Mr. Hammersley moved the follwoing resolution:—"That this council, recognizing the desirableness of having in its own hands the supply of gas to the inhabitants, instructs the General Purposes Committee to inquire upon what (if any) terms the British Gaslight Company, Limited, will sell to the corporation that portion of their Staffordshire Potteries Works which is supplied from or dependent upon their Etruria station." He was sensible the corporation recognized the desirableness of obtaining the control of the supply of gas and water. At present, however, the water question was involved in so many difficulties that he would not go into it. The British Gaslight Company deserved every credit for what they had done since they opened the works 50 years ago. Their neighbours were all going in for the purchase of the gas-works. Indeed, Longton had already effected it. Stoke, Fenton, and Burslem were agitating the question. Birmingham had just got the preamble of their bill passed, and at Wigan they had acquired possession by means of a loan spread over 50 years. With regard to the money which would be required, he explained that the capital expended by the company was £52,800, of which £42,000 carried a maximum dividend of 10 per cent., and the remainder a dividend of 7½ per cent. Reckoning the cost of that part of the works necessary to supply Hanley at three-fourths—say £40,000—he argued that the town of Hanley was paying to the company a revenue of 5½ per cent. upon its invested capital. In Burnley the profits from the gas were sufficient to do away with the borough rate. Mr. Baker seconded the motion. The mayor said he had had an interview with Mr. Linging, the secretary of the company, who had informed him that he believed the directors would be willing to meet the corporation in a most liberal manner. He (the mayor) hoped the friendly feeling which had always existed between the town and the company would be maintained. There would be no obstacle thrown in the way of the town arriving at the desideratum proposed by Mr. Hammersley. The motion was then carried.

Pumping-Engines for St. Petersburg Water-Works.—Messrs. Laidlaw and Son, gas and water engineers, Glasgow, have just finished a pair of splendid pumping-engines, which are to be despatched to St. Petersburg, as part of the plant of the great water supply scheme of the city of St. Petersburg New Water-Works Company, who intend supplying an important portion of that city, containing about 200,000 inhabitants, that has never had any systematic supply except that which has been retailed in small quantities from barrels drawn by horses. The districts embraced in the new water-supply area include Wassiliostroff, Vieux Petersburg, and Viborgskaja, the latter being on the mainland, the other places on two islands in the estuary of the Neva. For each of these three portions of the new water-supply area there is to be a pair of powerful pumping-engines, the water being pumped from the river Neva and distributed to the inhabitants without any need for filtering. The pair of engines about to be shipped will be erected near to the river in the Wassiliostroff district. They are of the horizontal condensing type, having a combined nominal horse power of 130 horses, with double-action pumps, and with double-beat Cornish valves, which are intended to be worked at a high grade of expansion, so as to economize fuel as completely as possible. The expansion gear which is applied to the engines is of a somewhat novel construction. The engines are provided with 30-inch cylinders, and are of 4-feet stroke. Those for the other two pumping-stations will be of less power—combined 80-horse power and 50-horse power respectively. The site chosen for the pair of engines now finished is on ground that is of comparatively recent formation, and it had to be piled in order to give the necessary degree of security. The necessity for a secure foundation may be judged of when it is stated that the engines are about 36 feet long, and that the weight of each sole-plate alone is about 10 tons. Altogether they form a massive and splendid piece of mechanism. They were designed by Mr. John Thomson, long manager of the Alliance Engine-Works and Foundry, and lately assumed as a partner by the old-established firm of Messrs. Laidlaw and Son, who have the entire contract for the new water-works, the contract price being upwards of £250,000. Messrs. Joseph Quick and Son, Westminster, are the engineers for this new water scheme.

Foreign Shipments of Gas and Water Pipes, Gas Coal, &c.—The following shipments from Scotch ports have been reported during the last three weeks:—To Havana—cast-iron pipes and connexions, 40 tons 13¾ cwts., £410; gas coal, 453 tons 12 cwts., £380; fire-bricks, 22 tons 10 cwts., £16. To the Mediterranean—gas coal, 30 tons, £32; malleable iron tubes, 3 tons 2 cwts., £80. To Antwerp—sulphate of ammonia, 101 cwt., £91; malleable iron tubes, 418 cwts., £557; pitch, £330; malleable iron tubes, 7 tons 10 cwts., £150. To Providence—fire-clay pipes, 330 tons, £630. To New York—fire-bricks, 32 tons 2 cwts., £33; fire-clay pipes, 23 cwts., £5. To Memel—cast-iron pipes, 46 tons 3 cwts., £314. To Montreal—fire-bricks, 66 tons 11 cwts., £57; and 14 tons, £14; cast-iron pipes, 89 tons 8½ cwts., £691; fire-clay pipes, £15; and 6 tons, £15. To Trinidad—coal tar, £5. To Dunkirk—malleable iron tubes, 313¼ cwts. 18 lbs., £343; pitch, £139. To Rouen—benzole, £1200; malleable iron tubes, 3 tons 2¼ cwts., £62; naphtha, £306. To Dieppe—pitch, 440 tons. To Nantes—malleable iron tubes, 3 cwts., £3. To Bombay—cast-iron pipes, 34 tons 18¼ cwts., £266. To Horsens—cast-iron pipes, 234 tons 10¾ cwts. 14 lbs., £1641. To Calcutta—cast-iron pipes, 7 tons 6½ cwts., £62. To Rotterdam—gas coal, 146 tons, £562 10s.; fire-clay pipes, £34. To Prince Edward's Island—cast-iron piping, 13 cwts., £10. To Otago, New Zealand—cast-iron pipes, 75 tons 1 cwt., £516; malleable iron tubes, 1 ton 18¾ cwts, £35. To Picton—gas-meters, £44; mallable iron tubes, 26½ cwts., £22. To Melbourne—cast-iron pipes, 454 tons 8½ cwts., £3084; malleable iron tubes and fittings, 24 tons 1 cwt., £476. To Rio de Janeiro—lamp-posts, £160; cast-iron pipes, 37 tons 16¼ cwts. 19 lbs., £333. To Quebec—fire-bricks, 105 tons, £265. To the Mediterranean—malleable iron tubes, 3 tons 11 cwts., £7; cast-iron pipes, 75 tons 8 cwts., £580; gas-fittings, £10. To Bordeaux—cast-iron meters, 2 tons 2½ cwts., 12 lbs., £161; malleable iron tubes, 7 tons 6 cwts., £146. To Montreal—cast-iron pipes, 157 tons 13¾ cwts., £1207; fire-clay pipes and other fire-clay goods, 75 tons 14 cwts., £195. To Antwerp—malleable iron tubes, 37 tons 4 cwts., £690; cast-iron pipes, 18 tons 17 cwts, £210. To Quebec, &c.—cast-iron pipes, 167 tons 10¼ cwts. 21 lbs., £1294; malleable iron tubes, 15 cwts., £15; another lot, 3 tons 11½ cwts., £72. To San Francisco—fire-bricks, 62 tons 10 cwts., £64. To Lisbon, Gibraltar, &c.—malleable iron tubes, 9 tons 12 cwts., £245. To Dunkirk—malleable iron tubes, 77 cwts., £84. To Dantzic—coal tar, 910 barrels. To St. Petersburg—fire-bricks, 150 tons.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

1491.—Willis, C., and Pearson, W., Bradford, "Improvements in double-acting pumps and pumping-engines for feeding steam-boilers, and other purposes." April 23, 1875.

1494.—Budge, R., Valparaiso, "A new or improved apparatus for raising water and other liquids." A communication. April 23, 1875.

1499.—Buchan, W. P., Glasgow, "Improvements in ventilating the soil and waste-water pipes and drains of houses, and in the construction and fitting of water traps or apparatus for the said purpose." April 23, 1875.

1505.—Cook, H. W., Thurlow Square, London, "Improvements applicable to the purification of carburetted hydrogen gas." April 23, 1875.

1506.—Middleton, J., Leeds, "Improvements in sink and other traps." April 23, 1875.

1515.—Lawrence, J. E., and Porter, E. V., Westminster, London, "Improvements in combined engines and centrifugal pumps." April 24, 1875.

1545.—Abel, C. D., Chancery Lane, London, "An improved apparatus for heating air or other gases." A communication. (Complete specification.) April 27, 1875.

1548.—Jewitt, H., Kentish Town, London, "Improvements in reflectors for lamps and other like purposes." A communication. April 27, 1875.

1569.—Nicholas, J., Manchester, "Improvements in apparatus for indicating the levels of water or liquid in reservoirs and other places." April 29, 1875.

1581.—Goddard, B., Southport, Lancs, "Improvements in taps or valves." April 29, 1875.

GRANTS OF PROVISIONAL PROTECTION.

1367.—Harries, B., Landport, Portsea, "A new apparatus for gauging the supply of water when used for flushing closets, domestic, or other purposes, in order to prevent waste." April 15, 1875.

1368.—Spencer, T., Euston Square, London, "Improvements in the purification of water and other fluids." April 15, 1875.

1374.—Howard, J., Nunhead Lane, Surrey, "Improvements in apparatus for supplying disinfectants for disinfecting water-closets, and for other purposes." April 15, 1875.

1393.—Brakell, C., Manchester, "A new or improved engine for obtaining and applying motive power, applicable also as a fluid meter, and apparatus or appliances in connexion therewith." April 16, 1875.

1401.—West, W., Kentish Town, London, "Improvements in compressing, storing, and utilizing air and other fluids, and in apparatus therefor." April 17, 1875.

1440.—Newton, W. E., Chancery Lane, London, "Improvements in the construction of water-meters." A communication. April 20, 1875.

NOTICES TO PROCEED.

4286.—Tandy, G. G., Penge, Smith, F. H., Peckham Rye, London, "Improvements in lamps." Dec. 12, 1874.

4357.—Grebby, E. J., Halstead, Essex, "Improvements in mechanism applicable to the construction of gas, steam, or water engines and pumps." Dec. 17, 1874.

4365.—Spice, R. P., Westminster, London, "Improvements in the manufacture of gas." Dec. 18, 1874.

4387.—Johnson, J. H., Lincoln's Inn Fields, London, "Improvements in the manufacture of hydrogen gas, and in the utilization of the by or secondary products obtained in such manufacture." A communication. Dec. 21, 1874.

4410.—Kirkwood, J. T., Bideford, Devon, Lascelles, C. T. E., New Cross, and Hall, J., Peckham, London, "Improvements in the construction of gas-engines and in the adaptation of the same as motors for vehicles." Dec. 22, 1874.

4420.—Willis, H., and Blick, J., Worcester, "Improvements in equilibrium slide-valves for steam-engines and engines worked by compressed air, gas, or water." Dec. 23, 1874.

4427.—Mann, W. T., Liverpool, "Improvements in or connected with hydraulic presses and pumps." A communication. Dec. 23, 1874.

442.—Stuart, C., Halifax, "Improvements in stop-valves and taps." Feb. 5, 1875.

1161.—Ingram, J., Oakham, Rutland, "Improvements in raising and forcing water and other liquids, and in apparatus for the same." March 31, 1875.

1333.—Lillie, J., Manchester, "Improvements in apparatus for regulating, measuring, and registering the flow of liquids." April 13, 1875.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3782.—Newton, A. V., Chancery Lane, London, "Improvements in means for lighting illuminating gas and in fulminating compounds applicable thereto, and for other purposes." A communication. Nov. 2, 1874.

3843.—Marchant, R. M., Hatton Garden, London, "Improvements in the manufacture of gas." Nov. 7, 1874.

4403.—Davis, H. T., New Cross, London, "Improvements in the construction of traps for sinks, drains, and other conduits for water and other fluids." Dec. 22, 1874.

71.—Abel, C. D., Chancery Lane, London, "Improvements in motor engines worked by gas or combustible vapour and air." A communication. Jan. 8, 1875.

425.—Crombie, E. E., Euston Road, London, "Improvements in dry gas-meters." Feb. 4, 1875.

590.—Peacock, J. C., Bloomsbury, and Rudkin, T., Smithfield, London, "Improvements in apparatus for cooking and boiling by means of gas." Feb. 18, 1875.

NOTICE OF APPLICATION FOR LEAVE TO FILE A DISCLAIMER.

2587.—Aitken, H., Falkirk, N.B., "Improvements in the manufacture of illuminating gas and in the apparatus or means employed therefor." July 24, 1874.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

816.—Temple, C. J., and Danter, R. S., "An improved union joint or coupling for hose and other pipes." March 18, 1872.

825.—Copeland, J., "An improved valve to be used for regulating and stopping the supply of steam, water, air, gas, or other fluids." March 19, 1872.

883.—Muschamp, J. B., "A new or improved liquid-meter." March 23, 1872.

901.—Clark, A. M., "An improved joint for the lids or covers of gas-retorts." March 25, 1872.

920.—Mathews, C. R., "Improvements in apparatus for safe, speedy, and easy mode in fixing, connecting, and disconnecting gas-pendant, bracket, pillar, or ground connexions, especially adapted for outside reflecting lamps." March 26, 1872.

921.—Smith, G. H., "An improved mode of and appliances for preventing the corrosion of iron pipes or tubes and keeping them free from incrustation." March 26, 1872.

924.—Wolstenholme, J., "Improvements in steam pumping-engines." March 27, 1872.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

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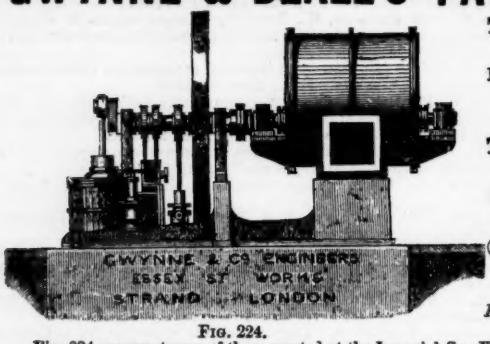

FIG. 224.

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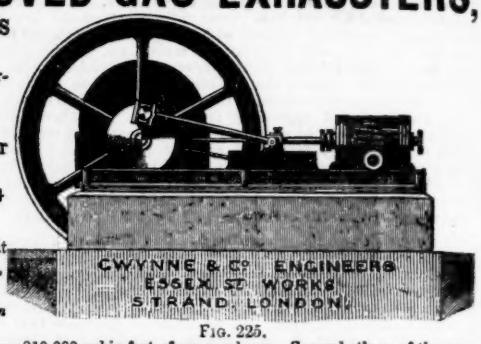

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

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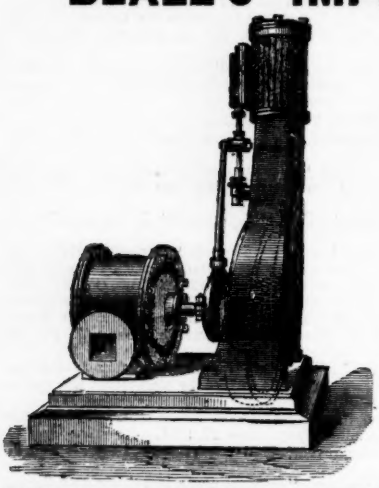
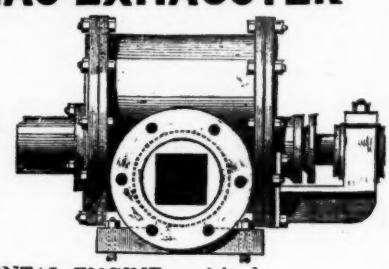


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



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"THE LANCET."

"Mr. Patterson has laid the gas consumer under considerable obligations. His process of purifying gas entirely by means of the Ammonia contained in it is at once ingenious, effective, and economical. The treatise before us examines the whole question of the Gas Purification of London in detail, and, as a contribution to the final settlement of the 'Sulphur question,' is worthy of its author's well-known powers of painstaking research and lucid exposition."

Mr. G. LIVESEY. *President of the British Association of Gas Managers*, 1874.

"It was not until the Sulphur Question was brought so prominently into notice by the difficulty experienced at Beckton, that the important part played by carbonic acid as an obstructive was made clear; and for this knowledge, I think, we are indebted to Mr. Patterson, who, at a time when all the Engineers and Chemists were fairly puzzled, by much thought and labour was led to the conclusion that the presence of carbonic acid was the cause of the failure to effectually reduce the sulphur compounds where lime was used; and what was better, Mr. Patterson, in an official report, stated the things so clearly that no one has since pretended that there is any difficulty in reducing the sulphur compounds where the purifiers are of sufficient extent, and it is possible to use lime. . . . It is well known that the presence of carbonic acid in the gas diminishes the Illuminating Power; it is therefore worth while, *on that ground alone*, to remove it. I can state that while using nothing but Newcastle coal from the Holmside Colliery during the past three months, without a particle of cannel, the gas has never been below 16 candles, and has averaged 16·5 candles."—*Inaugural Address.*

Mr. GEORGE ANDERSON.

"I believe that we are approaching an era when all the gas will be purified without Lime Purifiers. . . . I have read one or two pamphlets which Mr. Patterson has published; and I am bound to say—in the absence of that gentleman, and premising that I have never seen him—that I believe that Mr. Patterson understands more about the Purification of Gas than any one present does."—*Proceedings of the British Association of Gas Managers*, 1874.

"There can be no doubt that Mr. Patterson improved the purity of the gas at Beckton, as evidenced by the great diminution of Sulphur in the gas subsequent to his instructions being carried out. . . . Mr. Patterson seems a gentleman who, had he been thrown upon a desert island—I do not mean the Isle of Dogs, or down in Beckton vicinity, but anywhere else—would have found out the true way to purify gas."—Mr. ANDERSON in the JOURNAL OF GAS LIGHTING, *Nov.* 4, 1873.

"THE JOURNAL OF GAS LIGHTING."

"The hand of a skilled chemist is seen in these parts of the Invention, and, whether the processes have been actually tried and found effective or not, they seem to us to promise well. The Soda and Sulphide of Sodium washing certainly merit a trial."—*Dec.* 3, 1872.

"We should rejoice to see the use of lime superseded, on account of its expense, as well as the possibility of a nuisance. The success of Mr. Patterson's process of scrubbing with Solutions of Alkaline Sulphides would solve the difficulty at once; and *comparatively unimportant additions to, or alterations of, the present plant would secure complete purification, without offence in any locality.*"—*April* 8, 1873.

"Mr. Patterson is the first who proposed to purify gas by scrubbing with Soda and Sulphide of Sodium Solutions, a process which we believe would be found effective and cheap, and unproductive of nuisance."—*Oct.* 7, 1873.

"Mr. Patterson's processes designed for urban gas-works"—*i.e.*, by Gas Liquor and Soda and Sulphide of Sodium Solutions—"have never been applied on a manufacturing scale, although we have little doubt they might be used with perfect success."—*Sept.* 8, 1874.

"A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS."

"This more perfect means of purification demands *an entire* REVERSAL *of the operations*. . . . Even when oxide of iron is used, and when it is desirable to obtain only a reasonably perfect purification, *this process is* INDISPENSABLE."—JOURNAL OF GAS LIGHTING, *Dec.* 1, 1874, *p.* 727.

WILLIAM BLACKWOOD AND SONS, EDINBURGH AND LONDON.

MESSRS. JOHN BETHELL & CO.,

(ESTABLISHED 1836,)

CONTRACTORS for GAS TAR,

MAKERS OF ANTHRACENE, CREOSOTE, &c.,

CLAYTON CHEMICAL WORKS, MANCHESTER;

SWAN VILLAGE, WEST BROMWICH.

Head Offices: 38, KING WILLIAM STREET, LONDON BRIDGE.

B. GIBBONS, JUN.,

DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,

STOURBRIDGE (Established 1834),

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts.

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular .	14 in.,	15 in.,	16 in.,	18 in.
Ovals . .	17 in. × 14 in.,	17 in. × 15 in.,	20 in. × 15 in.,	21 in. × 15 in., &c.
D's. . .	14 in. × 14 in.,	15 in. × 12 in.,	15 in. × 13 in.,	17 in. × 14 in., 18 in. × 13 in.
	18 in. × 15 in.,	20 in. × 16 in.,	22 in. × 14 in.,	24 in. × 14 in., 24 in. × 15 in., &c.

Special attention given to the execution of Export Orders.

GEORGE ORME & CO.,

GAS METER MANUFACTURERS, BRASSFOUNDERS & FINISHERS,

ATLAS METER-WORKS, OLDHAM.

CONSUMERS WET & DRY GAS-METERS ON THE MOST APPROVED PRINCIPLES.

STATION-METERS, GOVERNORS, PRESSURE-REGISTERS,

And every Description of Gas Apparatus.

GAS, STEAM, AND WATER FITTINGS.

WANTED, a situation as Gas-Meter FITTER, or in any capacity. Willing to make himself generally useful. Four years good character.
Address E. S., 25, Elizabeth Street, WALWORTH, S.E.

WANTED, a re-engagement as MANAGER of Gas-Works, where the make is from 15 to 30 millions. Thoroughly efficient. Highest testimonials and references from present and previous employers.
Address, in first instance, to No. 140, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a practical retort setter, a SITUATION, to take charge of the working department of a Gas-Work. Has for some years held a similar situation, and can produce first-class testimonials.
Address No. 154, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOREMEN.

WANTED, at a large Provincial Gas-Works, two active and intelligent MEN to take charge of the Retort-Houses (night and day alternately). Must be able to manage and control the men, and preference will be given to those who have had experience in a similar capacity. Wages, £2 per week.
Address, in the first instance, to 153, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C.

A GERMAN Merchant, of good standing, wishes to be charged by a first-class English manufactory of SANITARY EARTHENWARE, with the SALE of their manufactures in Germany.
Address H. 01916, care of Messrs. Haasenstein and Vogler's Advertising Agency, HAMBURG.

MANAGER WANTED.

THE Bury St. Edmund's Gas Company require a MANAGER of their works, who must be thoroughly able to take charge of them, and devote his entire time to their management.
A Clerk and Collector are kept.
The present yearly make of gas is nearly 30 million feet. The town contains 15,000 inhabitants.
The works are in an excellent state, and are supplied with the most modern and improved machinery.
The salary will be £250 per year, with a house, nearly new on the works, of which the Manager has the use, free of rent, rates, and taxes; he is also supplied with coals and gas free of expense.
Applications, with testimonials, to be sent to me on or before the 13th day of May next.
WILLIAM SALMON, Secretary.
Dated this 25th day of April, 1875.

NEW EDITION, NOW READY,

ADVANTAGES OF GAS FOR

COOKING AND HEATING.

By MAGNUS OHREN, A.I.C.E., F.C.S.

For Companies to issue to their Gas Consumers.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

ON SALE—A Station-Meter, 4 ft. by 4 ft., with 6-in. connexions, valves, and bye-pass. Only been erected five years. Can be seen at work. The only reason for being removed is to be replaced by a larger one.
Apply, to H. AND F. BAILEY, Gas Engineers, &c., EAST RETFORD.

ON SALE (on account of replacement by larger), one set of four 10-ft. PURIFIERS, with lifting gear, dry centre-valve, 10-inch connexions. The whole of the apparatus is Thorncliffe manufacture, and in capital condition.
Apply to Mr. LONGWORTH, Dukinfield, MANCHESTER.

DRY GAS-METERS.

FOR SALE, CHEAP, Six 3-light and Eight 2-light. New and of best make. Price list and discount on application to GERALD J. TUPP, 8, John Street, Adelphi, LONDON, W.C.

RHOS GAS COMPANY, LIMITED.

FOR SALE—A complete Gas Apparatus, in good working order. Capable of making from 7000 to 8000 cubic feet in 24 hours. Suitable for a village or large works.
For further particulars, and order to view, apply to the undersigned, to whom tenders must be sent, on or before Monday, the 31st of May.
GEO. E. WOODFORD, Secretary.
Rhos, near Ruabon, North Wales, April 23, 1875.

WOLSTON'S TORBAY IRON PAINTS.

THE Torbay and Dart Paint Company, Limited, 23, Great George Street, Westminster, S.W., having been informed that PAINTS not manufactured by them are being offered to Gas Companies and the public as "WOLSTON'S," hereby give notice that they will TAKE PROCEEDINGS against any persons infringing their rights as sole proprietors and manufacturers of Wolston's Torbay Iron Paints.
(See Advertisement on another page.)

TO MANUFACTURING CHEMISTS.

THE Directors of the Glossop Gas Company are prepared to receive TENDERS for the TAR and AMMONIACAL LIQUOR produced at their works for One or more years, as may be agreed upon, commencing from the 1st day of July next.
Particulars may be obtained on application to the undersigned, to whom sealed tenders must be sent, on or before Saturday, the 8th day of May next.
DAVID CLARKE, Manager.
Gas-Works, Glossop, April 22, 1875.

THOMAS LAMBERT & SONS

MANUFACTURE EVERY DESCRIPTION OF

GAS AND WATER FITTINGS;

ALSO,

WROUGHT-IRON TUBES & FITTINGS.

SHORT STREET, LAMBETH, LONDON.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

NOTICE is hereby given that the ORDINARY GENERAL MEETING of the SHAREHOLDERS of the above Company will be held at the Offices of the Company, No. 60, Cornhill, in the City of London, on TUESDAY, the 25th day of May inst., at Three o'clock in the afternoon precisely, to receive the Report of the Directors and the Accounts of the Company for the half year ending the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, and to transact the general business of the Company.

The Transfer Books will be closed from the 12th to the 25th inst., both inclusive.

By order of the Board,
ALFRED LASS, Secretary.

Offices, 60, Cornhill, London, May 1, 1875.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(INCORPORATED BY ACT OF PARLIAMENT.)

NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the City Terminus Hotel, Cannon Street, London, on TUESDAY, the 25th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, a Dividend declared for the half year ended the 31st of December, 1874, and the usual ordinary business of such meeting transacted.

Notice is hereby also given that the Transfer Books of the Association, and the Register of Shareholders, will be closed on Tuesday, the 11th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 25th inst. By order of the Board of Direction,

ALBERT F. JACKSON, Secretary.

No. 30, Clement's Lane, Lombard Street,
London, May 3, 1875.

TENDER FOR GAS COALS.

THE Directors of the Petworth Coal Gas and Coke Company are open to receive TENDERS for a supply of 500 tons of Best Screened Derbyshire Silkstone GAS COAL, to be delivered at Petworth Railway Station in such quantities and at such times as may be directed by their Manager, of whom further information may be obtained.

Tenders, addressed to the undersigned, endorsed "Tender for Coals," on or before Thursday, May 13, 1875.

Petworth, Sussex. W. BUCKMAN, Secretary.

TENDERS FOR GAS COAL.

THE Directors of the Ratcliff Gaslight and Coke Company are prepared to receive TENDERS for the supply of about 20,500 tons of best GAS COAL, of which a specification may be obtained on application to the Engineer, at the Works, New Crane, Wapping, E.

Tenders to be sent in, endorsed "Tender for Coal," on or before the 17th day of May, 1875, to the Secretary, at the Company's Offices, 345, Cable Street, London, E.

The Directors do not bind themselves to accept the lowest or any tender, but the person or persons whose tender may be accepted will be required to execute an agreement, prepared by the Company's Solicitors, for the due performance thereof.

May, 1875.

TO COAL PROPRIETORS AND OTHERS.

THE Gas Committee of the Bury Improvement Commissioners are prepared to receive TENDERS for the supply of 8000 tons of COAL, and 5000 tons of CANNEL, to be delivered at the Railway Station, Bury, in equal monthly quantities during the year ending March 31, 1876.

Further particulars can be obtained on application to the undersigned.

Tenders, endorsed "Tenders for Cannel and Coal," addressed to the Clerk of the Bury Improvement Commissioners, to be sent in not later than Saturday, the 15th day of May.

JOSEPH WOOD, Engineer and Manager.

Gas-Works, Bury, Lancashire, April 22, 1875.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Bury Improvement Commissioners are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their works, for One, Two, or Three years.

Further particulars may be obtained on application to the undersigned.

Tenders, endorsed "Tenders for Tar and Ammoniacal Liquor," addressed to the Clerk of the Bury Improvement Commissioners, to be sent in not later than Saturday, the 15th day of May.

JOSEPH WOOD, Engineer and Manager.

Gas-Works, Bury, Lancashire, April 22, 1875.

TO GASHOLDER MAKERS.

THE Directors of the Clayton, Allerton, and Thornton Gas Company are prepared to receive TENDERS for the erection of a single-lift GASHOLDER, 105 feet diameter and 26 feet deep.

Drawings and specifications can be seen at the Office of the Company during office hours, from Wednesday, the 28th day of April, to Saturday, the 8th day of May, 1875.

All tenders to be sent in, addressed to the Chairman, and marked on the outside "Tender for Gasholder," on or before Monday, the 10th day of May, 1875.

The Directors do not bind themselves to accept the lowest or any tender.—By order,

JOHN NIVEN, Engineer and Manager.

Gas Office, Clayton, near Bradford, Yorkshire,
April 23, 1875.

"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

J. C. SELLARS,

THE GAS CEMENT WORKS,

BIRKENHEAD.

---

70 SHARES OF £5 EACH (FULLY PAID UP) IN THE FONDER'S END AND ENFIELD HIGHWAY GASLIGHT AND COKE COMPANY, LIMITED.

MR. F. W. SEARLE will Sell by Auction, at the Lecture Hall, High Road, Tottenham, on Tuesday, May 4, at Six for Seven o'clock in the evening, in 14 Lots, the above SHARES in that established Company.

Particulars, with Conditions of Sale, may be obtained of the AUCTIONEER, TOTTENHAM and ENFIELD.

---

100 SHARES IN THE TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.—SALE BY ORDER OF THE PROPRIETOR.

MR. F. W. SEARLE is favoured with instructions to submit to public competition, at the Lecture Hall, High Road, Tottenham, on Tuesday, May 4, at Six for Seven o'clock in the evening, in 20 Lots, 100 Fully Paid-up SHARES, of £5 each, in that well-known and flourishing undertaking, the Tottenham and Edmonton Gaslight and Coke Company.

Printed particulars, with Conditions of Sale, may be obtained at the Offices of the Auctioneer, TOTTENHAM and ENFIELD.

GAS COMPANIES AUDITS AND ACCOUNTS. SPECIAL DEPARTMENT.

MESSRS. BROWNE, STANLEY, & CO., Beg to inform their Clients and Friends that they have added this speciality to their general business of Public Accountants and Auditors.

The department will be under the management of Mr. W. Monro Platt, who for 13 years held the appointment of Secretary and Accountant to the West London Junction Gaslight Company, Limited.

Terms on application at Messrs. BROWNE, STANLEY, AND Co.'s Offices, 25, Old Jewry, LONDON.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

South Shields. W. J. WARNER.

Mr. NORWOOD EARLE,

GAS SURVEYOR,

12, QUEEN VICTORIA STREET, E.C.,

Advises on all matters connected with the Distribution of Gas, Public Lighting, Gas Testing, &c.

Valuations made for Assessment and other Purposes.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WM. RICHARDS,

INVENTOR OF THE DRY GAS-METER,

REVISER OF "HUGHES ON GAS-WORKS,"

CONSULTING GAS ENGINEER,

Advises on all matters of business connected with Gas Lighting. Furnishes Working Drawings of Retort-Settings, Specification of Works, complete or in detail.

11, ST. MICHAEL'S ROAD, STOCKWELL,
LONDON, S.W.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 43, Parliament Street, WESTMINSTER.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

WATER-MAINS.

COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¼ to 2 inches and upwards. They cost less than the ordinary plan.

Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine: (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, 1½ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101 Cannon Street E.C.

GARSIDE'S IMPROVED REGISTERED TUBE-VICE, holds all sizes of Wrought-Iron and Brass Tubes, from a 2-in. socket to the smallest brass tube made.

GARSIDES IMPROVED MAIN DRILLING CLIP, made in two sizes, to drill from 2-in. to 6-in. Mains, and from 6-in. to 12-in. Mains.

The above tools are made light and handy.

For drawings, &c., apply to the maker, SAMUEL GARSIDE, Gatefield Iron-Works, ASHTON-UNDER-LYNE.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,

BELFAST.

HOPKINS, GILKES, & CO.,

LIMITED,

MIDDLESBOROUGH,

SUPPLY GAS & WATER PIPES of EVERY SIZE.

Plain, Turned and Bored, and Coated.

CAST-IRON RETORTS.

Castings for Gas-Works of every description.

EXHAUSTERS.

LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

NEAR

BLAYDON-ON-TYNE.

GAS-METER INDEXES, INDICATORS, TELL-TALES, &c.

Every description of Worm and Wheel Cutting.

A. BAILEY,

MANUFACTURER,

86, Crampton St., Newington Butts, London, S.E.

*** *Country Orders executed with dispatch.*

A. B. has for many years supplied some of the best London firms.

INTERNATIONAL EXHIBITION, 1862.

CLASS X.

PRIZE MEDAL

For excellence of Fire-Clay Gas Retorts, and

"HONOURABLE MENTION" for good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,

THROCKLEY,

NEWCASTLE-ON-TYNE.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

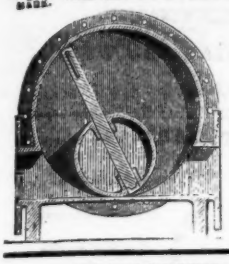
NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to

B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

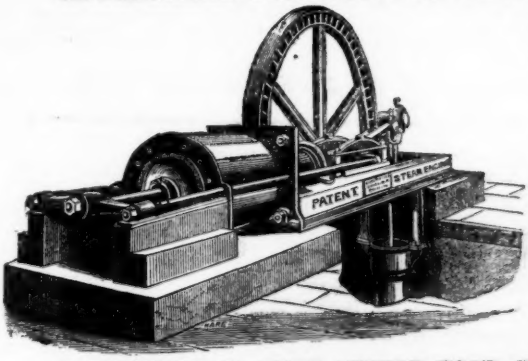
ECONOMY OF FUEL IN STEAM-ENGINES.

B. DONKIN & CO.,

PATENT HORIZONTAL COMPOUND CONDENSING

STEAM-ENGINES,

APPLICABLE FOR DRIVING GAS-EXHAUSTERS.



These Engines have been at work a sufficient number of years to prove their durability and efficiency.

One of them has been subjected to a scientific and exhaustive trial to test the consumption of fuel, with the result that an expenditure of less than 2 lbs. of coal per hour developed one indicated horse power.

Full Details of this Trial, and Prices, sent on application to

B. DONKIN & CO., BLUE ANCHOR ROAD, BERMONDSEY, S.E.

KÖRTING BROTHERS,

SOLE LICENSEES FOR

W. CLELAND'S PATENT STEAM-JET GAS-EXHAUSTER.

E. KÖRTING'S PATENT STEAM-JET GAS-EXHAUSTER.

SMALL COST—COMPACTNESS—PERFECTLY SELF-ACTING—SELF-REGULATING—SELF-CLEANSING—SMALLEST BOILER PRESSURE SUFFICIENT—NO STEAM-ENGINE—NO GEARING—NO ATTENTION—NO EXTRA ROOM REQUIRED—NO TEAR AND WEAR—NO NOISE—NO OSCILLATION IN VACUUM, OR BACK PRESSURE.

UPWARDS of 100 in USE in CONTINENTAL GAS-WORKS.

IN ENGLAND, SUPPLIED TO—

The Gaslight and Coke (Chartered) Company's Works, London.
The Liverpool United Gaslight Company's Works, Linacre.
Cornholme District Gas-Works, near Todmorden.

These Gas-Exhausters are kept in stock in 16 different sizes, delivering from 500 cubic feet to 60,000 cubic feet of Gas per Hour, at

KÖRTING BROTHERS,

STEAM-JET ENGINEERS, 7, LANCASTER AVENUE, MANCHESTER.

LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS

BY

SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION TO

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,

VICTORIA CHEMICAL WORKS, BRADFORD, MANCHESTER;

SOLE MANUFACTURERS OF SPENCE'S PATENT DRY COPPERAS, SPENCE'S PATENT GAS DEODORIZER, AND MUDIE'S DISINFECTANT;

MANUFACTURERS OF

SULPHATE OF AMMONIA, VITRIOL, COPPERAS, &c.;

PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his CELEBRATED HALBEATH STEAM COALS, on Navy List.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

MOBBERLEY & PERRY,

THE HURST

FIRE CLAY and BRICK WORKS,

STOURBRIDGE.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAY.

Manufacturers for Home and Export.

GAS-RETORTS, GLASS-HOUSE FURNACE, BLAST-FURNACE, & TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

C. & W. WALKER,

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE,

MANUFACTURERS OF

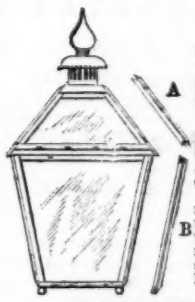
TELESCOPIC AND SINGLE-LIFT

GASHOLDERS,

CAST & WROUGHT IRON GASHOLDER-TANKS,

CONDENSERS, SCRUBBERS, & PURIFIERS.

LONDON: 8, FINSBURY CIRCUS, E.C.



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Requiring New Street-Lamps are recommended

A **KEEN'S PATENT DOUBLE-CLIP STREET-LAMP.**

A great improvement on the old-fashioned 14-in. Lamps.

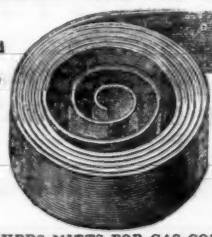
They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.

B For particulars of price, &c., apply to

WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

LEATHER DRIVING BANDS,

Hose-Pipes and Fire-Buckets, Canvas Hose, Sponge Cloths, Cotton Waste, &c.



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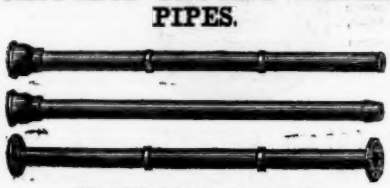

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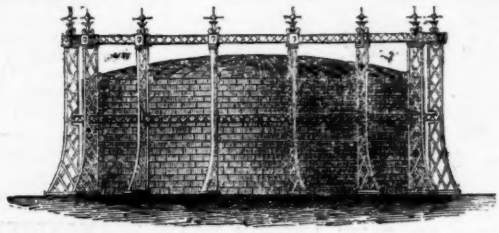

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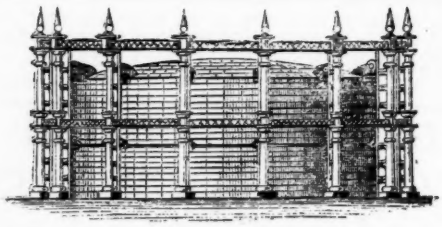

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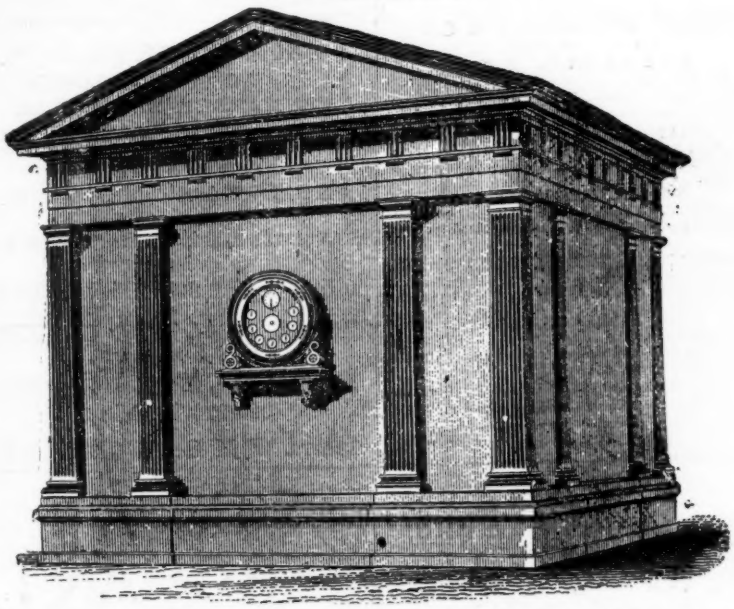

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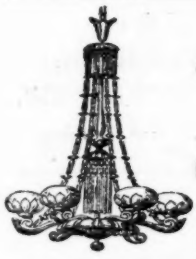

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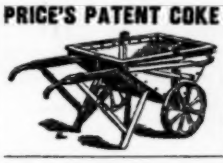

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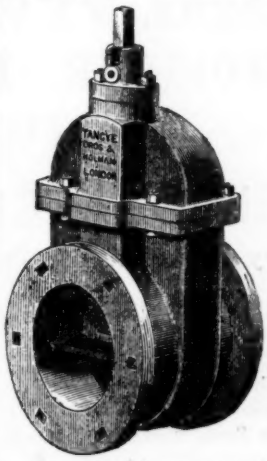

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

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Purified gas per ton of coal in cubic feet (average)	**10,775**
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1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.	Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure	13,095 cubic feet.	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	34·83
Value of 1 cubic foot of gas in grains of sperm	780	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	71 minutes.
Gravity of the gas (air = 1000)	596	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.	Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	33·09
Value of 1 cubic foot of gas in grains of sperm	878	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	67 minutes.
Gravity of the gas (air = 1000)	677	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

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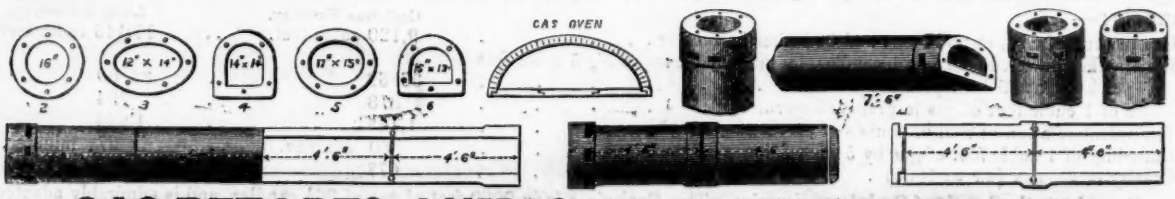

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